QST

A MAGAZINE DEVOTED EXCLUSIVELY TO THE WIRELESS AMATEUR

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1917

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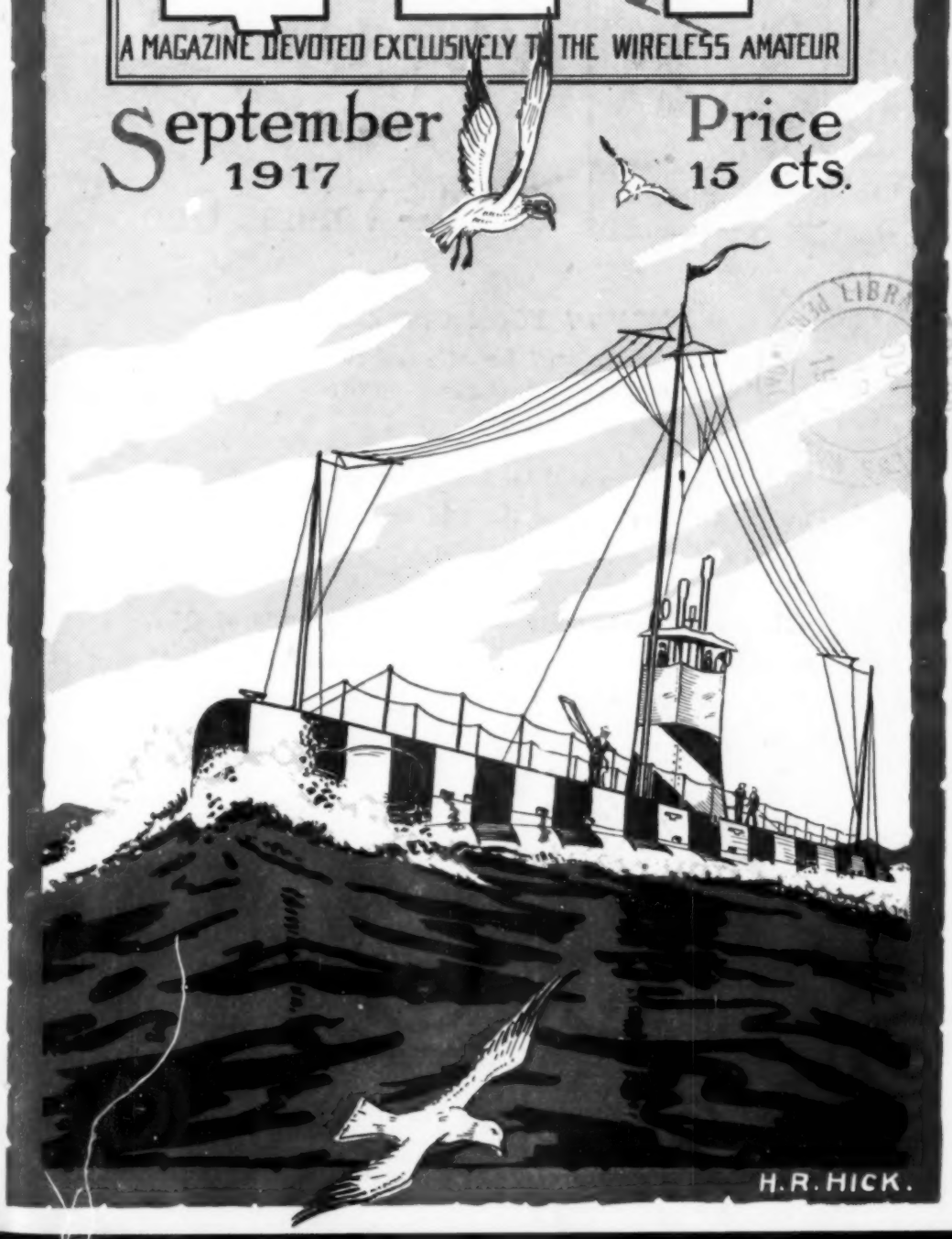

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THE QST PUBLISHING COMPANY, INC.
HARTFORD, CONN.

Concerning Phantom Antennas

Washington, August 16, 1917

Mr. C. D. Tuska,
Manager and Editor, QST Magazine,
Hartford, Connecticut.

Dear Sir:

I have to acknowledge your letter of August 10th, inclosing Lieutenant Latham's letter of July 26th. Lieutenant Latham is quite right in stating that radio apparatus cannot be used for experimenting at all. But it must be borne in mind that apparatus commonly used for radio work ceases to be "radio" apparatus when entirely disconnected from the other necessary components of the radio installation.

It is not intended at all to forbid doctors using induction coils for taking X-ray pictures, or physical laboratories from performing the many conventional induction coil and transformer experiments. For such experiments no license was needed, and it would be absurd to think they were forbidden.

But all experiments involving inductance and capacity and such power and voltage as would justify the experiments being called "radio telegraphic experiments" are forbidden. No aerial must be used, nor ground connection made. In short, all the experiments usually performed by amateurs must cease. The statement that "no experiments should be made in which radio frequency oscillations are produced" is perhaps slightly too broad, as noted above, but it is undoubtedly true that no radiotelegraphic experiments are permitted.

This would be a good time for amateurs to use their surplus energy in learning the American Morse Code, for all good operators should know both codes; in order to secure a Commercial Extra First Grade License, for instance, one must know the American Morse. Land-line telegraphy is a particularly promising field for women or for the amateurs who cannot pass the physical examination necessary for enrollment in the Naval Reserve Force.

I think the situation is pretty clearly defined now, and can be summed up concisely as follows: No radio telegraphic experiments at all. If any point is still not clear to you, please write us to that effect.

Very respectfully,

Reed M. Fawell,
Lieut. Comdr. U. S. Navy,
For Director Naval Communications

This explains why Dr. Radio's article on Phantom Antennas has been withheld.—Editor.

Q S T

A Magazine Devoted Exclusively to the Radio Amateur

Ground Telegraphy

By Roy Griffith

THERE is nothing new about the fundamental principles of ground telegraphy, but my friend and I have applied modern instruments to it, and I have devised some methods of eliminating QRM from power circuits using the ground, which I believe are new.

The main idea is to use two grounds at each station, exciting the pair of grounds with a battery, key, and buzzer for transmitting, and connecting a telephone receiver across the grounds for receiving. See diagram below.

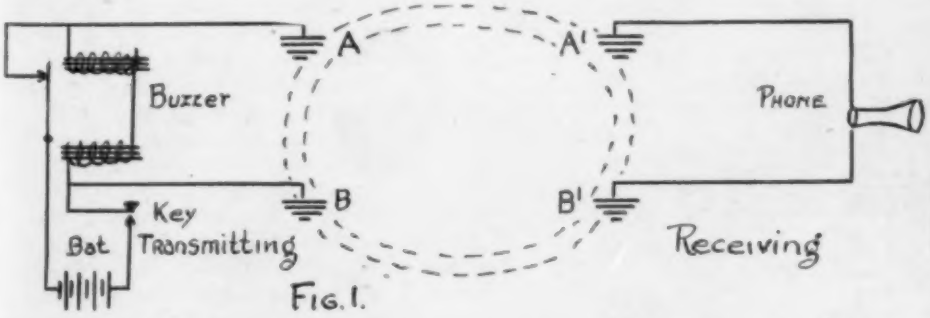


FIG. 1.

The buzzer at the transmitting station has the grounds A and B connected across its windings, thus utilizing the relative high E. M. F. of self-induction in the coils to excite the grounds. Now the greatest part of this current flows between the two grounds at the transmitting station, taking the shortest path between the two and spreading out but slightly. Some of the current spreads out, as shown by the broken lines in the diagram, and some small fraction of this spreads far enough to reach the receiving station, where part of it flows thru the phones connecting the receiving grounds. Now if stations AB and A'B' are separated by a given distance, obviously, to get the best response in the receiver, the distance between A and B, and between A' and B' should be as great as possible. In other words, the greater the distance between grounds at each station compared with the distance between stations, the greater the signal strength, or the larger the fraction of the current passing from A to B, which passes from A' to B'.

To think that such a system is practical over even short distances shows how marvellously sensitive the telephone is. Suppose the distance between stations is a half mile, spacing of the grounds 20

or 30 feet, the exciting power an ordinary buzzer and a 6 volt storage battery, and the receiver an ordinary Bell phone—how inconceivably small must be the fraction of the total current which reaches the phone! I wonder how many figures there would be in the denominator! Yet a lay-out like that just described is entirely practical.

Now for some working data. The power may be drawn from dry cells, storage battery or step-down transformer. The buzzer should be arranged to give a high-pitched note, especially if there are ground currents to read through. Most of us OM's know how to make a buzzer squeal, but the best method I have found is the following: First get an ordinary **small** watch-case buzzer. Solder the contact spring rigidly to the armature. Then remove all excess weight of solder and iron from the armature, making it as light as possible. Connect a two mfd. condenser and a telephone across the windings and adjust for a clear high tone by bending the armature supports with pliers while the buzzer is in operation. Often it will be found desirable to wedge the fixed end of the armature with a little wad of tape, or other resilient material, rather than to try to get the final adjustment by bending the supports. I have just doctored up a buzzer like this, and find, by comparison with a piano, that the tone is about 1400 cycles! This is probably too high.

The transmitting grounds may be connected either across the buzzer contacts, or across the windings. Results are the same. However, if the grounds are good ones, connecting across the contacts prevents

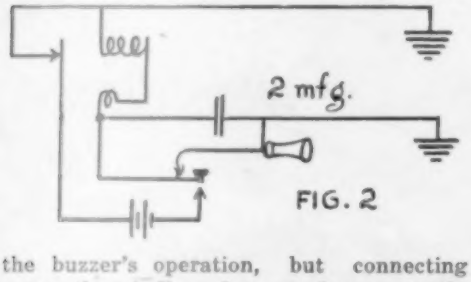


FIG. 2

the buzzer's operation, but connecting across the windings does not do so as easily If difficulty is experienced from this cause, connect a sufficient resistance or a 2 mfd. condenser in one of the ground leads. The 2 mfd. condenser will not cut down signal strength in the slightest degree and will not spoil the buzzer's tone as another hook-up would. This condenser can also be used to make a "break-in" system out of the arrangement. See diagram, Figure 2.

The condenser shunts the telephone while receiving, but here again this will not cut

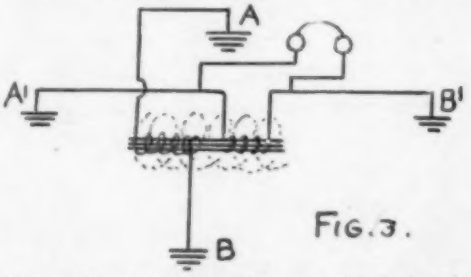


FIG. 3.

down the strength of the received signals. The back contact on the key is necessary to prevent wasted power and fractured eardrums while sending. I think this is the ideal hook-up.

The grounds need not be very good ones. I have found that an iron rod several feet long works as well as a good water pipe ground. Of course, the two grounds should be as widely separated as possible, and the line joining them should be perpendicular to the line to the other station. If the water and gas pipes come into the house well apart, they may be used as the two grounds, but I think it is always much better to use separate grounds, spacing them as much as possible and directing them properly, as explained above.

The receiving telephone should have a low resistance, the lower the better. High resistance wireless phones are excellent if connected with the secondary of a 1 inch spark coil, the primary being connected in place of the phone shown in the diagram, but they are useless without a step-up coil.

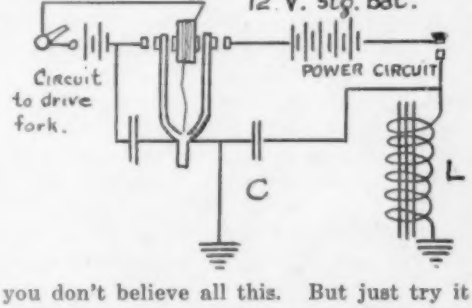
Since the buzzer's counter emf. is absorbed by the grounds, or by the grounds and condenser, there is no spark at the contacts, and so a **dozen** dry cells may be used, if necessary, without injuring the buzzer. A medical coil or a small spark coil may be used instead of the buzzer, but they are not as good, because the buzzer combines high emf. and low resistance.

This, I think, covers the main points.

For a further discussion, and experimental results, see the experiments of Morse, Lindsay, Trowbridge, Highton, Dering, Preese, Smith, etc., in Fahie's "History of Wireless Telegraphy." This is a wonderfully interesting book, particularly on this subject. Of course, the experiments recorded employ too long base lines for most of us, but a great deal can be done with a base line of 50-100 feet. See also Gernbach's "Wireless Telephone." For some very interesting laboratory work on lines of flow and equipotential lines, closely connected with this subject, see Ames and Bliss, "A Manual of Expts. in Physics" and Fahie, p. 96, Prof. Bell's experiments.

Now comes the great difficulty. The light companies make a practice of grounding their neutral wire on a 3-wire system or one of the outside wires on a 2 wire system. Since these grounds are located at the power house and at pole-top transformers, houses, and various places, it is practically impossible to find points on the ground which are at the same potential. A good deal of the current returns thru the ground rather than thru the wire, and as the grounds are so numerous, we can pick up some of this stray current by connecting a phone to a pair of grounds separated a few feet **anywhere** in a civilized community, and the strength of this current (in ones field, lawn, etc.) will not vary hardly at all when we change the **position** of the grounds, but only when we separate them by different distances. Thus the "ground hum," as we may call it, cannot be eliminated by locating our grounds properly, and of course if the hum is of any appreciable strength it will greatly interfere with the working of a set like the above. If a constant 60 cycle hum is encountered, and if 60 cycle current is available it can be easily balanced out of the phone circuit by means of a coil of a few turns of wire carrying the current for a small lamp (10 watts or so) arranged at the proper distance from a similar coil in the phone circuit. The coils must be arranged so that the currents oppose each other and the latter must be in phase. This is all very simple. Listen to the situation I have to cope with here at Narberth, Pa. Connecting a volt-meter between the gas and water pipes, which enter the cellar wall about 20 feet apart, I get a current (D. C.) which varies from 0 to 10 or 12 milliamperes, + or —. This current must come from trolley lines at least two miles away! Of course, being D. C., it does not cause QRM, and if it did, a condenser would keep it out. Besides this, I get an A. C. hum, loud enough to be heard all over the room, which is a mixture of 60 cycle from the lighting lines and 25 cycle from the Penn. R. R. Main Line electrification half a mile away. The R. R. has taken every possible precaution to prevent interference with the Bell Telephone Co. from this cause, but still the juice leaks out. They have their rails carefully bonded, a heavy ground wire along their pole tops on each side of the track, a large copper ground plate below each pole, and a 3-4 inch copper cable connecting the poles on each side of the track. Yet, with all this, I get a regular roar in a telephone half a mile away with grounds only 20 feet apart. This current is of course not constant, but varies greatly in strength. Besides, whenever a car starts, a rising note can be heard in the phones. This rises in pitch and intensity as the car speeds up, until it is a perfect **screech.** It is caused by the brushes on the commutator bars, the motors used being laminated commutator type series motors. In addition to all this racket I can hear splashes of our old friend QRN! Now I know that if you have never listened in on a pair of grounds

TRANSMITTING
FIG. 4



you don't believe all this. But just try it yourself or else drop in some time when you are near Philadelphia. The QRN is not as violent as on an aerial system, but it sounds like the real stuff when a thunder storm is approaching. The two can be shown to be identical by listening in on

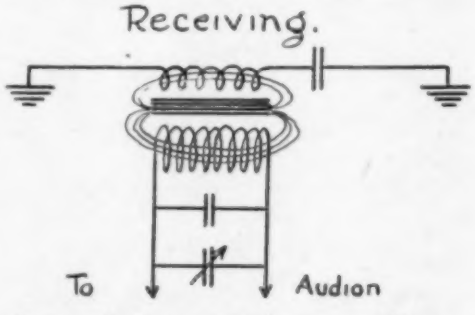
an aerial system and a ground system simultaneously.

To eliminate all this QRM without eliminating everything else in the way of the desired signals, I devised a system of 4 grounds in connection with what I call "balancing coils." The phones are connected to the secondary of a half inch spark coil, arranged to slide easily back and forth over the primary, which is rewound in two sections, each occupying half the core and connected in opposition, each to a pair of grounds. The secondary is moved to a position where the QRM all balances out.

The two pairs of grounds, as explained above, are about equally affected by the QRM, but the signals, **coming from two definite grounds only,** affect one set of grounds more strongly than the other. It is even possible to set one pair of grounds on an equipotential line with respect to the transmitting grounds, and then set the other pair at right angles to these, in the position shown by the diagram. Then, while the QRM is all balanced out, the signals affect one pair of grounds not at all, and the other pair to the maximum degree. The fact that the QRM can be **completely** balanced out requires that the 60 cycle and 25 cycle affect the two pairs of grounds in the same relative proportions, that is, so that the ratio of 60 cycle to 25 cycle in each pair is the same. This condition is usually approximately realized. If it is not, the 60 cycle and 25 cycle balance at different points. Even then a perfect balance may be obtained by balancing the 25 cycle with the "balancing coils" and then balancing the remaining 60 cycle externally as above. Merely to secure a balance it is not necessary that the grounds be arranged symmetrically, or that the two pairs be equally spaced. The balancing coils will take care of any sort of combination in this respect. The grounds are arranged in a quadrangle to secure maximum **signal** strength. If we can get perfect silence to work in, attempts can then be made to secure **telephonic** communication. Also we can try audion amplifiers and M. A. F.'s on the received signals.

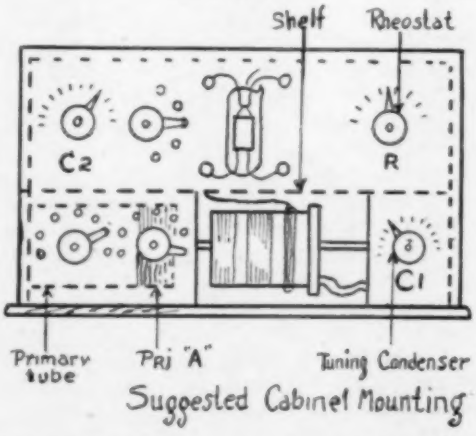
As a last caution! If you use gas and water pipes at one station don't expect that signals will be strongest with gas and water pipes at the other station. The currents do not seem to follow the pipes.

I believe some advantage might be secured by using a transmitting current of a definite frequency, determined by a high pitch tuning fork, and having both transmitting and receiving circuits tuned to this frequency. Iron core inductances and paper and tinfoil condensers might be designed, and the final adjustment secured by means of a variable condenser.



Some of these experiments ought to prove interesting, especially for those of us who are at home in these war-times. If any of our readers try these experiments and get good results, I would surely like to hear about it.

ERRATA



This cut should appear in place of the one shown in the second column of Page 11. The cut shown on Page 11 was placed there by mistake; it belongs with "Ground Telegraphy."

Something Rotten Somewhere

By The Old Man

WELL, SAY! Zenneck arrested and interned! What do you know about that!!! The gent who wrote that big book on Wireless which "Final Authority" always quotes from at Radio Club meetings and which "Radical" always flatly contradicts.

The papers say our authorities not only pinched the old boy, but interned him for the duration of the war. Well, now you know that means only one thing. There is something awful rotten going on somewhere, and it is Wireless, by heck, too, because our Department of Justice would never have selected Dr. Zenneck to occupy a front seat in the cooler for the rest of the war if the old gent had not been monkeying with the oscillatory business somewhere.

It sure does make an old wireless bug sit up and take notice. Zenneck is a wireless authority of the first class, and a German one at that. That means something more than being a Brazilian or a Patagonian wireless authority. Our erstwhile Teuton friends know a pure wave when they see one, and also which end of a wireless set you bite off and which end you light. Zenneck has been one of the world's authorities on radio. He was the big boss at WSL, Sayville, it seems to me. Sayville had a lot of trouble in the early days of the war, before we thought of taking a hand.

On several occasions they put it all over our Naval authorities when it came to monkey business. First of all they sent plain war dope to their German war ships in the Atlantic. No conscientious scruples or by-your-leave at all. They just sent it. We amateurs all noticed it. As it is not strictly according to the usages of polite war for a neutral country to permit use of its territory by one of the belligerents for conducting its attacks upon the other belligerent, our Naval authorities decided to put Naval operators in at Sayville. These operators would send out only perfectly neutral, gentlemanly messages.

Well, did this bother old Zenneck? Not so as you would notice it. He doped out one to beat this in fifteen minutes, probably. Pretty soon our naval operators were sending out the same dope themselves, only on its face it looked different. Then it was that one of us amateurs over in Jersey got into the game and gave the biggest lift an amateur ever gave the Government. Apgar, the old sleuth, smelled something rotten just about the time some of the rest of us did. But he got busy while the rest of us only sniffed. He rigged up a phonograph and for nights and nights he sat up and recorded everything that Sayville sent out. During the days he found time from his job to repeat and study the stuff. He found very peculiar words used peculiarly often and phoney repeats and what looked like phoney messages.

He and the Secret Service got together finally and a case was brought up in court, and good old Apgar had the honor of helping the Government win it. Everybody at Sayville was bounced, including Zenneck, and the Naval authorities thereafter worded the messages themselves. That was the only way to circumvent Zenneck. Give him a piece of wire and some power and he isn't a safe person to have around these days. What he doesn't know about monkeying with oscillatory circuits, probably isn't worth bothering about until next century. No wonder, now that we ourselves are at war with his country that the Navy locked him up.

And speaking of this, have you noticed that Zenneck's arrest followed closely upon the disclosures that the Germans knew all about the sailing of our first batch of troop ships in time to have a gang of submarines out in mid-Atlantic to attack them and send several thousand of our boys to the bottom? Only our Navy convoy

saved them. Now how did this dope get to Germany ?

Say ! Do you suppose old Zenneck, the fellow who wrote the book we used to see advertised in QST, could answer that question ? Was it another one he put over on us ? Is it possible that old duck worked out a hook-up that enabled a message to be sent which finally got to Germany without being heard in this country ? When we took away from him the wording of his messages did he work out a way to send them from some secret station by oscillations which cannot be heard unless you are in on the know ? Like the undamped stuff, for example, only one more on top of it, just as the undamped is one on top of the ordinary spark ?

The papers had just a few lines that they probably did not understand themselves, but which came down through with enough left in it to start the amateur thinking. It was something about "super-imposed oscillatory circuits." Now, what's that, for the love of Pete ? It's something new on your uncle. Never heard them mentioned at any Radio Club meeting I ever attended. My, my, but it is a pity this all happened during mid-summer when our Radio Club is out of business. "Final Authority" would tell us all about it, whether he knew or not, and "Radical" would have to work up a whole new line of contradictions. No time is being wasted, however, because I took the trouble to cut the article out of the paper and send it to each. They will mull it over, each separately, and unto his own methods and liking, and I have a well defined hunch they will be about as near alike as a positive and negative charge. Come Fall I shall have something to tell you about this "super-imposed dope," most likely.

My own guess may as well be set down now as anytime. It is that our one time German friend has worked out a plurality of circuits something like multi-plex land line telegraphy and he "super-imposes" these in some manner so that you cannot hear his signals unless you have some combination which only he can furnish you. If he can do this, and I don't put it past him, then he could have put up an aerial somewhere and actually sent out signals which we would not have been able to hear. Again, no wonder they took his tools away and locked him up. But, on the quiet, son, how about getting just one swift glance at such a hook-up ? Wouldn't it come in handy when we get going again after the war ? No more QRM agony. After we make up again with old Z, let's ask him into the A. R. R. L. He's probably O. K. His trouble is with his Kaiser.

Just think of this Desperate Diamond Detective wireless business going on right under our noses, and we not knowing a thing about it. Don't it make you ache ? It makes you wonder how Apgar feels. Maybe he and the Secret Service are at it again copying German super-imposed stuff on some kind of a three story phonograph. Only the other day the papers came out with another one you can put in your pipe and smoke. They reported that the British Government had ordered the Marconi Company to suspend all transatlantic wireless until further notice. Now what does that mean ? It reminds me of the yarn I heard the other night about digging out an enemy signal system in London. It seems it looked to the English as though something was rotten in London when the German zeppelins and flying machines found it so easy to locate the city at night. One night an order was issued to put out every one of the official sixteen aerial search lights between 1.05 and 1.10 a. m. Only five minutes notice was given. All sixteen lights were out between the times noted but there was still left one light which did not go out. There was a seventeenth, in other words.

The latest, up to this writing, is an article in the papers about a German radio station being found in an out of the way place between the hills in Campechi, Mexico. Down Yucatan way, as I remember it. It was reported as being in fine working order and doing business.

It seems kind of unneighborly of our Mexican cousins to stand for a thing like that, but they did. At least they did not stop it. And what's to prevent a station being set up at some isolated place in Mexico and collecting its information from agents in the States who could wire it to El Paso or Brownsville, carry it over the

border and re-wire it to the station ? Looks easy to yours truly sitting here on the bleechers.

And if it is possible to get one station in Mexico is it not possible to get two ? And if two, why can't Germany count on having at least one on the job ? Mexico might remonstrate of course to this unneutral behavior, after we had told them to, but could Mexico put enough pep into her remonstrance to Germany to stop unneutral use of wireless within her borders ? Probably not. Then Uncle Sam, after yawning and stretching, would wake up and allow as how if Mexico couldn't stop enemy wireless in Mexico, he would have to go in and stop it himself. Then there would start another row and some of us would have to change our clothes to light weights and go into Mexico.

We would then have one more war, and the business of killing men would go merrily on. Leastways, that is how it looms up to a wireless bug on the bleechers.

It seems to me that wireless is the big trouble for us here in America. The enemy wants to know what we are doing to lick him. He wants to know this awful bad. He will gladly sacrifice half a dozen Zennecks to find out. And he is no "ham" when it comes to wireless. He knows the game probably better than we know it. And it is a safe guess that he will go to any length to operate wireless here in America or in Mexico. Therefore, fellow amateurs, why isn't there a place for us stay-at-homes with the flat heads and square feet ? All we can do as things stand is to keep our eyes skinned and our radio ears open. If enough of us do this, it is a cinch that some day somebody will see or hear something which has a rotten radio smell to it. Once we locate this smell the job is done, because we have a clew to work on. If we are in the W. U. T. Co. or the Postal Co., all the better. Even if we are in the Post Office service, we have lots of opportunities. Remember old Apgar over in Jersey. He didn't find any actual hostile messages. All he found was suspiciously frequent use of certain words. Only a little thing by itself, but it had a rotten smell to Apgar and time showed that Apgar's smeller was all to the good.

We should always be on the watch for little things. The German is not naturally a good liar. He thinks he is and that is where he sets his foot on the banana peel. He gives himself away easier than most people when it comes to hiding a bang up good technical job. Therefore, his secret wireless will probably always be comparitively easy to find. It would not be going too far to expect him to show it to you in some cases if he believed you were capable of appreciating it. So, don't keep it a secret if you know wireless. Blab about it on general principles. Talk about loose couplers, detectors, regenerative receivers and "super-imposed oscillatory circuits" until your tongue gets writers cramp. Holler your head off in the street cars—and maybe some day a Dutchman will approach you and say—"You know wireless, hey ? Vell, vhen all is doing, maybe I show you someting inderesting," which is your cue to call up the local United States District Attorney and let him do the rest.

Did it ever occur to any of you bugs that may be we could be a big help in locating enemy wireless if we could satisfy the Government that we could be trusted ? It has occurred to several of us out here in the country. Take our receiving sets and our skill in operating them. I wonder if there is a Navy station any more sensitive than any one of a hundred amateur stations we could almost call off from memory. Take those of us who were located near Chicago and have heard stations both on the Pacific and Atlantic coasts. And remember that these latter stations were using only one kw. or less. Look at the list of call letters heard and still being reported in QST. The junk used would make a Government official sick to his stomach, but it works in our hands. We know how to use a match on an audion bulb or where to locate a magnet and how to monkey a motley array of home made tuners and variables until wonders and miracles are performed. If we were allowed to listen to undamped long wave stuff it wouldn't take long with our hungry ears before we would be getting stuff that no professional station could hope to get. Remember Professor Taylor out at the University

of North Dakota rigging up a wire from his window to a tree and reading the German damped and undamped stations. And his aerial was actually below the level of the surrounding prairie, due to his house being down on the banks of the Red River of the North. He told us about it in QST last winter.

And think of the number of us there would be to listen, even counting out those who have enrolled and are now in the service. It seems from the aforesaid seat on the back row of the bleechers that a lot of help might be given, and some dope might develop which otherwise would be missed altogether. We heard of one amateur who copied German stations before the war and got stuff which neither Tuckerton nor Sayville could get and actually phoned it to Tuckerton when the latter gave it up. Strange things happen in wireless and especially in amatuer wireless where the operator is hungry to do something and will work night after night getting things to their very utmost efficiency. Not one ordinary paid operator in a hundred will scratch as hard as most amateurs to read faint signals.

And another thing: With listening going on all over the country, isn't it likely that some impure or stray stuff would leak into the phones of some nearby listener, which would never reach the log of the big Navy station? If there is a way to send signals by superimposing tricks so that normally nothing would be heard a hundred miles away without knowing the trick, wouldn't a nearby amateur station be likely to get hold of some of the forced oscillations from guy wires, etc.? Again I say, from the bleechers, it seems it would.

Maybe the trouble is that the Government don't see any way to trust us. If that's the obstacle, isn't there some way we could be sworn in, or give bonds or oaths or some darned thing which would register us?

Think it over, you stay-at-homes, old and young. We want to do something even if our feet are flat.

G N - 73.

A RADIO RAVIN'

With apologies to Edgar Allen Poe

*****

I

Once, upon a midnight dreary,
While I listened, drowsy, weary,
To the faint and fading signals from a hundred miles and more,
Suddenly, I heard a sputter,
Then a spark with hiss and flutter
Made me think of words to utter
That I'd never said before.
And this spark with hiss and sputter
For some time the air did clutter
With its wierd, unmeaning roar.
'Twas a "ham,"—and nothing more.

II

Stopped the sounds, once more I listened,
And my eyes with joy then glistened
As I heard the famous station just installed in district four.
As I listened, (all elation)
To this great, far-distant station
Whose faint signals seemed to thrill me, chill me to the very core;
Then again my phones resounded
By a wave with breadth unbounded,
Made me wish my ground switch grounded
And my phones upon the floor.
Who was this that jammed the ether with his awe inspiring roar?
Just a "ham,"—and nothing more.

III

"QRM or QRT," have your say, what e're it be,
But anything you say to stop them only serves to make them sore.
Evening after evening spending
Listening to these sounds heart-rending
Sends a man to stages pending
Entrance to the asylum door.
Makes him—once thought hardy, tireless,
Feel like chucking up the wireless,
Throwing 'phones, condensers, tuners,
In the ash-heap, out the door;
Give up all his old relations with his friends in other stations
With a growl of "Nevermore!"

8WR

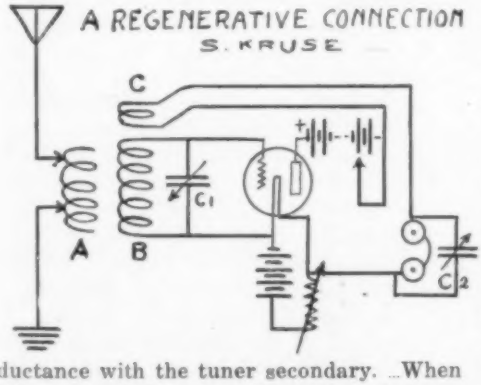
A Regenerative Audion Connection

By S. Kruse

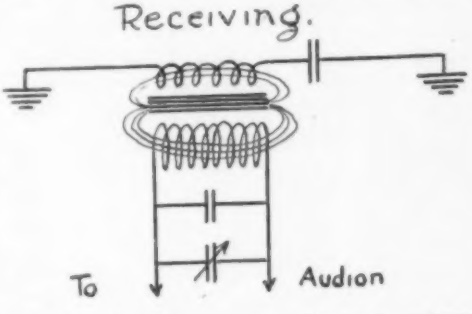
DURING the past winter it has been my good fortune to contrive an audion circuit of the regenerative type that has proven to be extremely sensitive, highly selective, and capable of giving great amplifications, without the usual tiresome tendency to go out of tune at the slightest move of the operator.

In view of the enormous number of operators now using the audion, it is highly probable that this circuit has not only been used, but also published. Nevertheless I have found that it is new to most amateur operators and this warrants its appearance here.

Reasoning from the fact that the audion has a relay action and that a small amount of applied energy will cause a very considerable change in the strength of the phone current; it seemed reasonable to suppose that if one coupled the phone circuit to the excitation circuit the process might be repeated with still further amplification. The most obvious way of accomplishing this purpose is to insert an inductance in series with the phones, and couple that in-



ductance with the tuner secondary. When this was tried no amplification whatever was secured, excepting on the very short wave employed by a local spark coil station. This suggested the idea that a capacity shunt across the phones was necessary and that at very high frequencies the capacity of the phone cord sufficed to produce the required effect. Accordingly, a variable condenser was connected across the phones. At once signals of the most



amazing loudness were obtained, 8AEZ being nicely readable with the phones on the table (the distance is 600 miles) while many ships could be read all over the room. The tuning also was very sharp and only in a few cases could one hear more than one station at a time.

Trials of various tuners, condenser capacities and series coils have been made and so far the most satisfactory results have been secured with the instruments here described.

The tuner primary "A" is 3 inches in diameter and the winding consists of 49 turns of No. 26 double silk covered wire tapped to two 7 point switches, special attention being paid to making the taps short. The winding is continuous, the taps being esparate lengths of wire which avoids the extra length of current-path found in loop taps. The tube is a cardboard one soaked in paraffin to prevent shrinking, but the winding is untreated. Tubes of the correct size may be cut from "Dutch Cleanser" boxes.

The tuner secondary "B" is 2 1-2 inches in diameter and carries two sections of winding. Each section is one inch long and is wound with No. 32 double silk covered wire. No taps at all are employed, all tuning being done with

the condenser. CA dead-end switch and two point secondary switch, provide a means of isolating the second section which is used only for ships. The condenser C_1 is a "Blitzen" variable from which half the plates have been removed, the rest being double spaced, giving quarter the capacity, or about .0002 Mfd. maximum. This has the advantage that the scale is "spread out." It is never necessary to employ more capacity than that given.

The extra coil "C" is of No. 22 double cotton covered wire, twelve turns three inches in diameter being "bunched" together. Larger and smaller sizes of wire as well as different numbers of turns and other arrangements of the same have given inferior results.

The amplifying condenser, C_2, is a common 43 plate variable air condenser. No condenser is used in the grid lead, as the present bulb is totally inactive when such a condenser is used. Many bulbs show this characteristic but in case the bulb used requires a grid condenser it may be used without altering the action of the circuit.

OPERATION

When the variable condenser C_2 is turned to O we have a plain DeForest audion connection. The desired station is now tuned in, the coil C slipped over the secondary tube, an inch or two from the used part of the winding, and the capacity of C_2 gradually increased while at the same time the coupling between the primary and secondary is loosened. In most cases signals will be received best with the secondary about 6 inches from the primary and about half of C_2 in circuit. Some practice is needed to keep track of the station required while making the change to the regenerative connection as it is nearly impossible to locate a station once lost without first returning to the plain audion connection.

If the amplification be carried above a certain point the signals change to a hoarse croak which is hard to read though extremely loud. The remedy for this is to loosen the coupling of B & C, tighten that between A & B, decrease C_2 or dim down the audion filament. In general it is necessary to burn the filament at lower heat than in the DeForest connection.

500 cycle signals stand much more amplification than other spark signals. The same thing holds for a very few high pitched amateur sparks but in the case of most such sparks the signals can be amplified only a little before they turn to a hiss. Low tones, on the other hand, can be amplified to a far greater extent, 8AEZ, 9ABD, 5ED and other low pitched stations being amplified to such an extent that it is possible to lay the phones on the table and copy them with no special difficulty.

Short undamped waves have been received with this connection, best results being with rather close coupling between all three coils. There does not seem to be any special reason why this same connection cannot be used to advantage with a large tuner in receiving long undamped waves. The special advantage of the connection would be in its relative insensitiveness to the approach of the hand in switching operations, since this does not have the usual effect of altering the signal pitch, though that may be changed at will by means of C_1.

QUALIFICATIONS FOR OFFICERS COMMISSIONS

Men who have not been called for physical examination under the draft, and who have had a college education may make application for a commission as first lieutenant in the Aviation Section of the Signal Officers' Reserve Corps as aviators or balloon pilots, provided they are not under 19 or over 30 years of age. While college men are preferred, applications from those who have graduated from high school and have exceptionally good qualifications will be considered. If the application is approved, the applicant will be notified to appear before the Medical Board for examnation. If this is satisfactory, he is assigned to schools for training.

While at the school soldiers' pay, rations, and sleeping accomodations are allowed, the officer's pay follows graduation and assignment to duty as first lieutenant.

Men having a trade who cannot fill the qualifications required for aviation or balloon pilots, can enter the aviation service by enlistment.

An Electromagnetic Switch

By T. H. Benson

THE aerial switch as employed in radio stations today differs little from those used in the infancy of the art. Beyond a few contacts for closing the primary circuit it is nothing more or less than a D. P. D. T. switch of large proportions.

A large aerial switch is the desire of every amateur; true it gives a commercial appearance to the station, but it is unwieldy, takes up valuable space and is oft-times leaky.

To remedy this, a well-known firm brought out an electromagnetically operated aerial switch that was a great improvement on the old style instruments, but being expensive, and the fact that it required quite heavy currents to throw it, prevented its general adoption in amateur stations.

The switch described herewith is of a very simple construction, efficient, quick in action and above all, easy on the 'juice.' It consists of a special switch operated by the magnets from a polarized ringer.

As to the switch proper, referring to Fig. 1, it is made from a block of fibre 1-2 inch thick and measuring 2 x 3 inches. The mercury cups are made by drilling holes with a quarter inch drill three quarter way through the fibre as shown, and in the center of each of these holes drilling a one-eighth inch hole to pass the 8-32 screws that are used to make connection to the mercury in the cups. The exact location of these holes is not important, the details being left to the constructor.

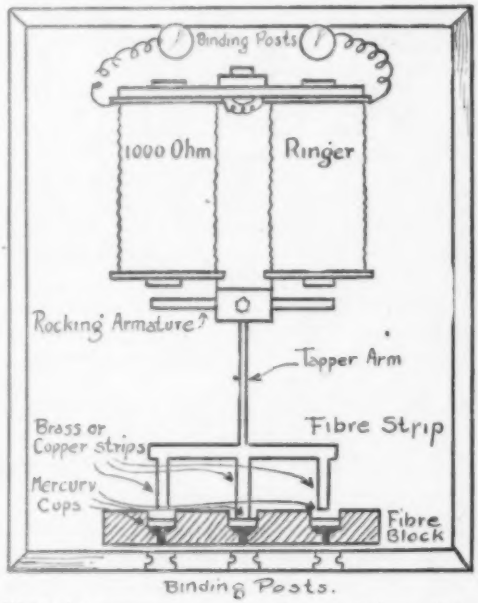
The moving part of the switch consists of a piece of 1-4 inch fibre wide enough to reach to the center of the holes, and a little shorter than the middle block.

Along the edges of this strip fasten a strip of brass which has three projecting prongs as illustrated, the center prong being 1-2 inch longer than the others. A one-eighth or three-sixteenth hole is drilled in the center of the block to pass the tapper arm of the ringer.

A baseboard of convenient size is cut and beveled, the ringer being mounted on the upper end with the tapper arm extending downward. The heavy block of

FIG. 1

An Electromagnetic Aerial Switch

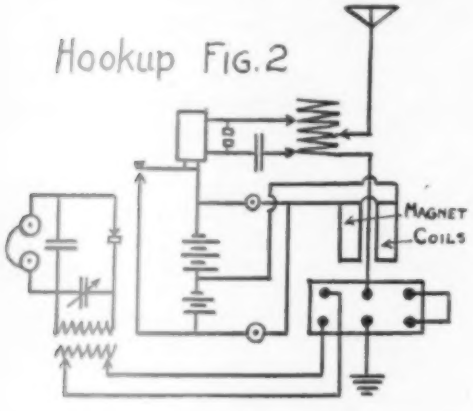


fibre is screwed to the board below the ringer. Now hold the base upright and lay the small block with the prongs in place, the longer prongs resting in the holes midway the length of the larger block. Tilt it back and forth so that the outer prongs will drop into the holes in the ends of the bottom block. The prongs should be bent so they enter easily and do not touch the sides of the holes as they go in. An extension may now be soldered to the tapper arm so that it will fit into the hole in the center of the upper block.

A few minor adjustments now remain to be made. Still supporting the base

vertical, connect a few dry cells to the coils of the ringer. This will throw the switch one way, make sure that the prongs on that end touch the bottom of the cup, if not, cut a small length off the center prongs.

Now reverse the battery leads, throwing the switch the other way and again make



sure that the prongs touch the bottom of the cups on that side also. This condition may be arrived at in some cases by slightly enlarging the holes in the center of the moving element. This should be done carefully, for the switch will be sluggish in action if the holes are made too large.

With a little care, this device may be so adjusted that with every reversal of the current, the switch will be thrown. This can be helped to a certain extent by balancing the moving parts.

After making sure that the screws in the mercury cups are tight, the cups may be filled with mercury to a depth of one-eighth inch. When the switch is thrown to one side, the prongs on the opposite side should clear the surface of the mercury by at least three-eighths of an inch. The switch may be mounted in a box.

The connections are clearly shown in Fig. 2, a tap being brought from the center of the regular battery used for sending and push buttons being connected in the leads from the ends of the battery. The wiring to the switch proper should be carefully studied, since it differs from the usual hookup employed with aerial switches. The helix is in the circuit at all times.

The pushbuttons may be mounted close to the key, and the combination will prove very handy, a mere pressure of the finger being required to throw from sending to receiving. Energy losses due to a leaky switch will be unknown, since it is in series with the aerial circuit, and no high tension stress will ever be created across the contacts.

Air Service In War

TIME has fully demonstrated the value of the air service in war, and experts say that many of the great decisive and effective battles of the future will be fought in the air.

This appears to be confirmed by the great activity of the Signal Corps and the passing unanimously by the House and Senate and the signing by the President without delay of the bill appropriating six hundred and forty million dollars for aeronautics.

25,000 MEN REQUIRED

It has been said that the United States would require, to do its bit in the war, 25,000 masters of aeronautical apparatus, —that is, men capable of flying the aeroplane and hydroplane, and directing the movements of the "kite" or observation balloon, known as aviators or balloon pilots.

AVIATORS AND BALLOON PILOTS

The work of the aviator is well known, and the marvellous results of these air-speeders; the work accomplished by them as the eyes of the army is published from time to time in the dispatches from abroad. The fastest machines attain a speed of 140 miles per hour.

The observers in them locate the position of the enemy's armies and guns, and protect cities and towns from attack, although at times the enemy's flyers get by

Concluded On Page 26

NOW THE ARMY

If any amateur wireless operator wants to get into military service other than the Naval, he now has a good chance in the Army. The latter is looking for radio operators in the Signal Corps, for both regular field service and for air service. We have not as much first handed personal knowledge of what the Army offers in the way of training and instruction in electrical engineering, as we have in the case of the Navy, but from what we hear, it is pretty good. There seem to be two branches. One is said to be a short course of training for service in the regular field companies, where the sets used are the portable ones mounted in a cart and operated by a small gasolene engine, and all a part of the regular hand forces. The other is a very much more elaborate training at one of the big aviation camps. Two months is the duration of the course and plenty of actual signalling from flying machines, as well as photographing, machine gun shooting and bomb dropping, is said to figure also. We have no doubt that the opportunities for a liberal education and a fine training are excellent and that a fellow who takes it will profit all the rest of his life.

A feature of it which sounds attractive is that in ninety days time, one would probably be in France, and seeing the real game. To those who are looking for this and who may be in doubt about their abilities to hold their dinners down in bad weather on the "salt sea ocean," this land service may be just what they have been looking for. If so they should immediately drop a line to Aero Personnel Division, Army Chief Signal Office, Washington, D. C. We were told that there are a lot of good jobs waiting for fellows who know radio. All those not already enrolled in the Navy, better think this over and get busy before the best places are filled. If we can help anybody, let them write in and we will do our best.

MORE STRINGENT THAN SUPPOSED

The lid is on tighter than we supposed. Not only is it no antenna and no radiation, but it is no ground connection, no capacity and no inductance. Think this over a minute. We happened upon all this accidentally the other day. We had supposed that one could build a rotary gap and run it and even hook it to a condenser and phantom antennae through a hot wire meter. Our attention was officially directed to the fact that this is not the case, however, and that any work of this kind would be contrary to the terms of the President's proclamation and therefore unlawful. We

believe this will be as much of a surprise to the majority of the amateurs of the country as it was to us.

The facts are that we must not touch any radio apparatus. All we can do is to read radio books and think radio thoughts. Until we become Germanized, we at least have these liberties. This does not proscribe a key or a head phone, because both may be used for other purposes. But it does proscribe a condenser, or a rotary gap, or an oscillation transformer, or a loose coupler or detector, because these have no other use than for radio purposes. It prohibits all experimental and research work in which radio frequency oscillations are involved for communicating anything. It does not prohibit the doctor's X-ray machine or his electrical massage gear, but it does prohibit all research work on submarine detectors employing radio. Of course, all radio inventing and development work must stop if anything more than a lead pencil and a piece of paper are involved.

How long this undemocratic condition is to continue, no one knows. Probably we amateurs better strictly observe the law for a while longer and give our authorities all the head they ask to enable them to conduct the war to a successful conclusion. We hope they will not hold us in our present uncomfortable position any longer than is actually necessary.

ANOTHER SEASON OPENS, BUT---

Good old September has come around once more with its promise to cut down on the static, but——. In happier days the coming of September would start us thinking about the cells in the "B" battery, and wondering how many of them had thrown up the sponge during the summer, but——. Probably many of us would already have gone so far as to take another look over that article on how to build a regenerative receiving tuner, and have made a few sketches of what would best suit a certain particular stock of miscellaneous pieces of wood and general junk, but——. Not a few would be writing in asking what was doing on audion bulbs about now and what the chances were going to be to get inside on something especially sensitive, but——.No doubt several would be measuring off the back yard and giving serious thought to Kruse's illuminating treatise, recently printed in QST, on "Tin Masts," but——. Anyway, the various manufacturers would be noting a big increase in their mail and they would be rolling up their sleeves getting ready to handle the coming business, but——.

This time, old September is different than he has ever been before. None of these little things dear to the heart of the Amateur Wireless Bug are happening. Not since "Amateur Number One," first strung a wire in the air, has there been a September like this fateful one of 1917. Not a single amateur aerial is in the air, from the Atlantic to the Pacific. The little buzzing spark is gone and dust covers the once shining apparatus. How long this condition will last is a guess. It probably will be many months, and we expect to see at least another September come and go which will be not much different.

'Tis a sad, sad tale. But, like most sad tales, it is not without a big ray of hope. This hope is that the present conditions cannot go on forever, and that the spirit of **amateur wireless** is just as much alive in these dead days as it ever was. Whether the law closes up our stations or even takes away our apparatus, whether we ourselves are scattered to the four winds of heaven, whether we are in the army in France, or in the Navy on the tossing sea, we are still Amateur Wireless Bugs, and nothing will ever change us. Dead Septembers may come and go and the years may change us from springy youth to sober age, but the call of the"spark" will still be in our hearts and the desire to have and use the little old set up in the attic or down in the cellar will still be the one great yearning. We will always be Amateur Wireless Bugs, come what may. That's right, isn't it, fellows ?.

ROTTEN, ALL RIGHT

Our dear old grouchy pal, "The Old Man" touches a very timely topic in this issue. That is, enemy wireless in this country. We who know something about wireless only too well appreciate what is possible when it comes to making a business of secret operating. The number of different ways in which the secret operator has the advantage over the one attempting to locate him is legion. In an extremely interesting article in a recent issue of the New York World, our old friend, 2RE, Mr. L. G. Pacent, points out the use that the enemy spy can easily make of steel frame buildings, lightning rods, and very short and very long wave lengths. He makes an eloquent plea for the amateur showing in arguments which must be pretty hard to refute, how the great body of amateurs would probably be of immense value rather than the reverse if they were set to work in some systematic listening organization. Our "OLD MAN," oddly enough, emphasizes the same point.

The peculiar conditions surrounding ourselves, Germany and Mexico in the present war, make wireless specially important. We are four thousand miles away, all cables are cut and Mexico is neutral, or supposed to be, and our next door neighbor. What would be more natural than short wave or some entirely new form of wave, for short distance communication between spies right here in our midst, and possibly for relay to Mexico. From Mexico to Spain or even Germany direct is easy.

How are we going to stop it? That is what is especially interesting to the amateurs who are kept at home. Most of us are true blue when it comes to loyalty and patriotism, and if we take Mr. Pacent's estimate. which we are certainly entitled to do, since he is identified with no less a house than our old friends, The Manhattan Electrical Supply Company, we have some $10,000,000 worth of apparatus with which to work. Is it not more than likely that we could do something with this? The argument is sometimes heard that we would hear the Navy wireless if we were permitted to listen. Suppose we did. It is in code if it is important, and does not the German spy listen to it anyway? If the latter has it what harm would it do for us loyal Americans to have it also? We would like to make a little bet that if we amateurs were permitted to listen, we would between all of us, dig some astonishing things and make it extremely interesting for those who are putting over the "rotten" stuff evidently now going on.

IF WE EVER GET LOOSE AGAIN

If an all wise Providence ever signs the papers letting us amateur wireless enthusiasts loose again, and if the same benevolent authority sends back to us in sound body and mind the army of trained radio operators now in the Naval service, there will truly be something doing in radio in these good old United States of America after the war. We have many times thought of this during the past months as we contemptuously regarded the two flat feet we call our own. A few of us were pretty snappy when it came to operating and handling traffic, last winter before we were closed up. What will it be like when a thousand or more trained naval operators take the place of these few? With their military experience and training and their familiarity with the finest kind of wireless apparatus, it looks to us as though amateur wireless might come pretty near being a new kind of a game when we get loose again. And it is not going to be boy's junk in the way of apparatus, either, nor boy's methods of handling traffic. These will go into the discard accompanied by a blush of shame that they ever existed. The A. R. R. L. and the traffic it will handle, when the happy days arrive, will be something that even the craziest of us has no idea of today. Think it over, you good fellow-in-the-service now. It is a sweet morsel to roll over in the mind. You will be big guns when you come home after the war. You will be the ones who will run things.

Radio Communications by the Amateurs

The Publishers of QST assume no responsibility for the statements made herein by correspondents.

Enemy Wireless?

Editor QST:

Just a few days after I received the June issue of QST, and read the O. M's excellent article on "Rotten" closing-up of stations, we figured in a little incident that might be called a fit companion to his "stuff."

As soon as our station was closed, we set up a buzzer, with loud, clear tone, and used it both for ourselves and also to give instruction or practice to some friends. Some of these have already gone, and others will go, as soon as they can "brush up" into Gov't service. We thought we were doing something very practical, being as we could not go into the service ourselves—right away, anyhow.

Well, it ran this way for almost two months, when some well-meaning but ignorant folks in the neighborhood thought we were working our wireless, and deemed it a patriotic duty to report the matter to the authorities.

At 9 o'clock one evening, we received a call from a special officer whom I took upstairs and showed the buzzer, and explained it to him. He admitted he never saw a wireless before. At 11:30, the same evening, he came back, accompanied by another "special" and two secret service men. All hands upstairs to see the buzzer! They might have known something about shadowing criminals, but (oh, my!) they surely never learnt a line about wireless, practical or theoretical. One of them asked me how far it would send (imagine that, with no aerial or ground!). Another asked me if we could receive with this buzzer! I sat up there on the old table, (all the instruments were packed away on one end of it) and gave a lecture on the buzzer, explaining that it was nothing but a doorbell, and if it was a receiving set, then there was a receiving set on the front door of every house equipped with an electric door-bell. They took our word for it, but I'll bet an audion to a snap switch that they didn't understand it.

Not satisfied with this, we directed a letter to the Supt. of Police, and explained the whole case, told what it was we were using, and why; also told him about the farce investigation. His reply showed some more ignorance on the part of the men who followed up the clue. The letter stated that they called at the house because previous to that we had been seen "using a wireless key" and "with a code book in our hands." Whadyemean, "code book?" Will someone please tell me if a book containing the Continental code looks any different at a distance than any other kind of book and, secondly, if you push a "wireless key," do you necessarily send out wireless signals?

The O. M. was right. It certainly is a joke when they send men out to look for illegal wireless plants when they don't know a wireless set from a front door bell. Why don't they see to it that they send a man who understands wireless, or why not commission some amateur in the city, who is not capable for military service? Then I think you would see some practical results and at the same time, the standard of the service would not be lessened, or be a subject for jokes.

Sincerely yours,

James A. Nassau, 3CT.

1510 N. 18th Street

Phila., Pa.

High Note--Low Note Again

S. S. Rush, Herendeen Bay, Alaska

Editor QST:

Dear Mr. Tuska,

Have noticed considerable controversy in your worthy little publication on the question of "High Note vs. Low." My experience in that line may be of interest.

In my own home station at Portland, Oregon, I have heard many kinds of spark among the amateurs, but have seldom heard what we would term "high note" in the commercial game. In Portland 7ZN and KDP handled practically all of the long distance communication, notably 7ZN, as KDP is unable to receive short waves efficiently for some unknown reason. Now while 7ZN has a heavy spk with good carrying qualities, yet the note—about 120-150 cycles—does not strike me as easy to copy. Of course, he being located in Vancouver, Wn and I in Portland, we're only separated by a few miles, so cannot say how his note sounds at a distance. Probably 6AV or 6EA cud enlighten us on this point. As for KDP, his note is slightly higher than 7ZN and reads a little better. As for carrying qualities, cannot say, as he is unable to work with any real distant stations. Whether they hear him, although he cannot hear them, is a question the distant stations will have to volunteer information on.

One night, a new note pierced the air. It was a 500 cycle spark and belongs to 7JH. Since that time, he has done very fine work, seeming to be the only one able to work direct with 7YS at Lacey. Wn. Seems that 7ZN can handle southern biz as far south as Los Angeles but can only occasionally manage a signal thru to 7YS. Seems to be a hole in the air north of Portland. Since 7JH's advent with his 500 cycle spk, his set has been the envy of many of the Portland fellows. Speaking with several of them who have made exclamation as to the superiority of his outfit, they all seem to agree that their enthusiasm in this respect is due to the fact that he is "easy to read." Personally, when idly listening in to various stations, if 7JH should start up, I wud tune out others for the pleasure of reading his spark. Others hv told me that they do the same. Seems that this unconscious habit of tuning in the high tones speaks well for them.

Now as to the commercial side. I have here on the Rush, a 2KW. 500 cycle quenched set. Owing to lack of sufficient capacity at the ships dynamo, I am unable to use more than 1KW. or half power. Now WAR has a 1KW., 120 cycle quenched set, and came up inside Kodiak Island, Alaska, some distance astern of us. When we got within working range of each other, he told me cud hr me 3 days before cud work me and he using his full power and I using my half power.

That, it seems to me, speaks well for the carrying capacity of the higher note. He had the additional advantage in aerials. My antenna is but 65 feet long and 40 high—his abt 175 feet long and 60 feet high.

Now as to QRM and the note question. We are laying in Herendeen Bay about 15 miles from KWR, who has same set I have —2 KW. 500 cycle quenched. Couple days ago WAM was anchored right off KWR. WRJ was days run from here (abt 200 miles), WNE 30 miles and WSG abt 75 mi., I should judge from her strength. I worked WNE a short time, then wkd WRJ. While copying WRJ, 200 miles away, WNE and WAM started working—one 15 miles away and using 1 KW. Couldn't tune 'em out without losing WRJ, but on acct his higher spk fnd it unnecessary to even bk them. WNE and WAM hv 1KW 120 cycle quenched sets and WRJ and WSG same as mine. Now as for QRM between like notes. Was copying WSG when KWR, 15 miles distant, started up. QRM? Never a bit. Just chgnd adjustment of receiver and WSG drowned KWR in 50 fathoms.

This is the "note" situation as I see it, so you will see I am a firm advocate of the 500 cycle stuff.

H. Sherman Pyle,
Chf. Opr. S. S. Rush

Mite add that 7JH uses only 100 watts while 7ZN uses 1-2 KW. and KDP from 2 to 4 KW!

Here's a Nice One From 9EP

I do not know if you are still hankering after these letters from the members of the League, but I have mooned around wondering how it was all going to end for so long that I feel like saying something to some congenial soul. I heartily endorse all that the Old Man says about our closing.

At this time we are depending on QST to keep us informed about things and we will still continue to back up the League and QST with whatever they need. In fact, I am writing to 9AMT (he shared relay honors in Denver with 9ZF last winter) who recently wrote me that when the war was over he was going to join the League, that he had better join now. We have no way of knowing what is going on except through QST, so it must be kept going, and Mr. Editor, I have recently heard several say that they would be willing to pay more if we could put QST where it stood several months ago, and of course providing the rest would do the same.

Regarding the contents of QST. I see that you have cut out the reports and call letters. Of course, there could not have been many more reports, but surely there were final reports for the season. And you stated that you had calls to last well into the summer.

The concensus of opinion around here is that you might have left out the article on Lightning Phenomena and substituted call letters for it. You see, the thing we feel the need of most is the thing that will keep us reminded of actual operating conditions, and if we could still be learning of new stations that have heard us for the next several months, we wouldn't feel the closing as badly as if we have nothing to remind us of those happy days when we thought it was a hardship to have all the QRM that we had. But we would give anything to be back there now. So please, Mr. Editor, let us still have the call letters providing you still have them left. And keep up the pictures and the amateur communications, even if you have room for nothing else. I am sure that we will be more interested in these things than the article of which I spoke, as we all, or nearly all of us, know the wherefor of lightning, and that it causes lots of QRN but beyond that we care little about it, except we would like to know of some way to relieve us of QRN. I have been reading about semi-annually that Prof. Pupin has been inventing a QRN preventer for the last six years, but nothing has ever come of it, so I guess that it is more or less of a false alarm.

I read Mr. Warner's letter with a lot of interest as I heard him often last winter, and worked with him quite a bit, but never had any luck with him. I could have but little better luck with 9ABD, who is only a little over a hundred miles away. He used to come in like a house afire for a few seconds, and then in a few seconds he would be inaudible. The same thing applied to a lot of others, also. Even 9JW only 60 miles away could scarcely ever be heard at night, though strange to say, he came a-roaring during the day. 9GY is another who faded badly. The easiest station to work seemed to be 9ZF in Denver, 560 miles away, with whom I have talked for hours with scarcely ever a repeat. He almost never faded and was sometimes audible 100 ft. from the phones. It seemed that stations ever 600 miles faded less than those closer. I do not believe that I ever heard 2AGJ in Albany fade and he was nearly 1200 miles from here. 6ZQ, in Phoenix, 1100 miles from here said that I never faded there and that it was very seldom that he ever heard a station east of Denver fade. I have noticed that it was nearly always the closer stations, say under 400 miles that faded the worst. So possibly distance is a factor in fading. It would seem so from my observation.

I was extremely interested in Mr. Warner's question about location. I believe that location has a lot to do with results and that radiation is no indication of what ones results should be. I know that radiating 3 amps prior to January 1st, I was consistently heard 1100 miles away. And I know of fellows who used to write me that they had heard me, who were radiating two to three times as much as I was, and yet were never heard anywhere. Af-

ter January 1st, I got a new transformer and increased my radiation to nearly 8 amps. But somehow or other I was heard but little farther than before, though I was reported much more QSA by everyone. I am generally given credit by the bugs here as having the best location in the city, so you will see that we are firm believers in location, and I think that location is 50 per cent. of a fellows set.

About receiving, I believe that location has nearly, if not as much to do with range as in sending. I did not have a Paragon last winter, but tested out one against the set that I used, and it was 500 per cent. better, and was using a hookup that was better than the one given in December QST, and which was a dandy. I never heard a First District station here all winter, 2AGJ was the only consistent 2nd and the only 3rd heard was 3PC and he only once. I heard 4 4's, but none consistently. I heard some 6's and 7's, but they were not consistent, either. I do not believe I had as good a location for receiving as for sending, so it might seem that the same location would not act the same for both sending and receiving. I have gotten a Paragon since we have closed and I am going after some real long distance receiving in a few years when the war is over.

These may help Mr. Warner out and if you don't print this, let me know and I will have it forwarded to him as it might interest him. In closing, let me repeat my first suggestion that you continue the call letters, pictures, and communications to the last, cutting the other things out first, as I think that is what most of us desire. I thank you for your patience in reading this and remain, as ever, an ardent follower of QST and the A. R. R. L.

Guy E. Wilson

Why Not Reform the "Squeek-Box?"

By ICO

I have read what the "Old Man" has to say about QRM with a great deal of interest and amusement, but when I look back on my "Ham" days, I wonder how it was that I behaved myself as well as I did. There was nobody to tell me what to do and what not to do; I passed the Amateur exam—but what of that? It simply taught me to leave the air free for commercial business and proved my ability to receive ten words a minute. As far as teaching me not to test my spark any time I felt like it, and all those other "Ham" tricks, it might as well have been on Sandscrit. We fellows with the spark coils felt that we were being bullied by the fellows with the high powered sets; they had the best of us—they drowned us out every time we sent, and then they tried to tell us to shut up when we were in the midst of a conversation with a brother "Ham" a mile away, so that they could receive some darn long-distance station that we couldn't hear. We had just learned how to "talk," and we wanted to improve. We thought it wasn't fair; we told them so, and a lot of other things.

I have a First Grade Commercial License now, but I still operate a one inch coil transmitter. By a great deal of hard work, I have made it a model of efficiency, and can now "work" stations 15 miles distant, (although not in all directions). Every now and then (although I am not home much) I have delivered relay messages, and helped some on their way. This suggested a plan. Why not reform the "squeek-box?" Teach him manners, and give him some responsibility. Why not establish trunk line routes of spark coil stations extending throughout our larger cities, and run test messages along them just like larger relay lines? Let them try to do a little relay work themselves, and then they will realize the difficulties under which the larger stations have been working. Above all, teach them how to tune their stations. Very little has been written on this subject, and the result is that newcomers try all sorts of fantastic arrangements, which they finally discard in disgust and become outlaws as far as tuning is concerned.

Sumner B. Young

First Class Advice

The June copy of QST read, and it does stimulate, to say the least, the interest that seems to lag, for it is true that a majority of Hams had their sets up just for the pleasure derived and not for the purpose of advancing themselves or the art But thank the real fellows for the chance to keep at it and experiment and study for now is the time to doll up the dope on why that loose coupler didn't work, or why the little boy makes more noise with the spark coil than you do with a Big One

There is no doubt but what this is the time that is going to prove whether or not a fellow has Blue Blood running neck and neck with the oscillations, for it takes lots to down the ardor of a radio "henginear," and the fact that the law says nothing about testing our sets with dummy antenna and improving them in regards to heat losses, radiation, brush discharge, mechanical and electrical design, so why not get busy? The same applies to the receptor, and a buzzer and coil will do all the sending for you, so that it is merely a question of how far your set can pick up the signals. Then again, why should simple mathematics stick a number of our fellow workers? Understand the principle behind the problem and go to it, and it won't be long before an aerial in the form of an inductance, condenser and coil of resistance wire looks the same as something stuck up in the air. If the close down is looked at in this way, it may be the making of a foundation for good long distance work in the future when the order is given, "Up Aerials."

In regards to Mr. K. B. Warner's article about the disadvantage of being a low lander and having his friend on the hill beat him in certain directions, I would like to call attention to the fact that Mr. Warner doesn't need anyone to tell him what the trouble is, for believe me, that story about what happened was just what I was looking for, for a long time, namely the ability to analyze what the answer might be and stating same when the article is written. He seems to have covered all the theory that is at hand to day, and I guess that the real trouble will be found out only under actual conditions of testing. His idea of the trolley wire being an antenna and re-radiating waves is the right answer as far as I can see, but there might be something done in the line of testing, such as 5 100 volt lamps in series and connected to trolley line and ground. This suggestion could be followed out if taken up in the proper manner with the Trolley Company, at least it would prove of great interest to many amateurs, for they no doubt have noticed the same thing.

The Old Man was rotten, to say the most, and I hope that he continues to go to movies, for what he had to say hit the mark, and he writes better stuff when he does go than when he stays home and spits on the cat. It is said that a man that is not connected with a business generally sees the weak spot and helps to build up with good suggestions. But, as the soldier said about the cannon ball, "We'll let that pass," and find out what has become of DR. RADIO. His mental gyrations were worth reading; besides, they helped lots. Why, it gave people a chance to argue, and that is a whole lot toward efficiency in a radio set.

The ideal station sounds good, and I want to get in on it, for there is a way to do everything better and get more time for other work. Go to it, and let's see what ideas are forthcoming, but take my suggestion and go down to the bare essentials needed for good sending and reception for the pendulum is swinging back toward the simple outfit and a lot of junk that causes the visiting friend to marvel and say, "How wonderful, I just knew Willie was another Marconi," is out of date and the sooner Willie gets it into his nut that a lot of switches and stuff pasted all over the room only causes loss of good energy, why the better. Some stations that you see remind one that the owner is trying to put himself through a course of training for piano moving. What with a coil up in this corner, a switch across the room and the sending junk on the floor, table and wall, it just naturally keeps one busy pulling and hauling on one thing and another in order to hear the kid in the next block. Introduce

your apparatus to itself and marry them for the juice gets all het up paying carfare to visit its friends the conny, sparks and icecilate.

What makes most fellows sore is the fact that they are unable to build apparatus that looks like the catalog; forget it, electrical efficiency first, then mechanical detail and finish are the order of the day. Why not use your spare time and get a thorough understanding as to the proper way that tools should be used, because you can't build a set unless you are able to handle material. Don't let a little thing like sawing a straight line or soldering brass phase you, just get some old material and practice with it. The satisfaction of saying that YOU made the set goes a long ways towards success and the ability to handle tools cuts the cost of instruments practically in half.

My mental storage battery is running low and the specific gravity is down around 1000, but as a last and beautiful short I want to say that QST returned with all its vigor since the war started, and the Editor ought not be called, for he certainly is doing a lot for his country by sticking to his job and giving the real fellows a chance to co-operate and forget that we can't send or receive. Work of the right kind properly directed aids all parties concerned, so you that have had the nerve to read this, get busy on that new set and make it something worth while.

W. J. Howell

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REOPEN CITY COLLEGE RADIO

(New York Times, 5-30-17)

Work on the reconstruction of the wireless antennae began yesterday at the College of the City of New York upon the rescinding of the Government order which caused the dismantling of the apparatus two weeks ago. When the order to dismantle all wireless apparatus except that under Government supervision was issued the powerful station at City College was not exempted.

The apparatus will be used in conjunction with the courses in telegraphy and telephony offered at the war summer session of the college.

S. U. I. WILL TRAIN ARMY TELEGRAPHERS

Course for preparing Iowa young men for Signal Service announced— No entrance requirements

In response to a request from the central department signal officer of the United States Army, the State University at Iowa City Iowa, will give during the next school year a course of training for telegraphers and wireless telegraphers. The work will be in charge of the head of the electrical engineering department and will be open to young men of the state, without regard to entrance requirements usually made or students by the University. The course for the individual will last only until he has mastered the art of telegraphy enough to pass the Government's examination in the subject.

"The need of telegraphers in the signal corps is serious," declared Lieut. Col. Wildman in a letter to President Jessup. "The available supply has been exhausted and new men must be trained to complete the present organization and prepare for the future increase."

The decision of the University to open the course to all, without demanding a certain preparatory training, is based on the belief that there are a large number of young men throughout the country who recognize the opportunity that the signal corps offers in the way of valuable experience, quick promotion, and variety of service, who lack the training ordinarily required by the University. No University credit is given for the work. It is offered simply as an aid to the Government in meeting the present emergency.

All of the University's present electrical equipment will be available for the course, and it is possible that more will be obtained. The major portion of the time of instruction will be consumed in actual instruction in sending and receiving in the Morse code, although some time will be spent in studying the elements of electricity and the technique of the apparatus.

The Evolution of a Field Battery

By Willis R. Prissell, 6VI Radio Co. A, 4th Field Batt'n

The New Field Radio Company "A"
Arrived on the Zone on the fourth of May.
They were brought by rail to the Corozal station,
Which, of course, was their destination.
Happily to bed they went,
Most restfully the night was spent.
The morning dawned most clear and bright,
As the boys rose up from a peaceful night.
The Transport trip had been a fright,
And all were glad she was out of sight.
The next day passed without a sign,
To disturb their restful peace of mind;
For there was naught for them to do
But lie on their bunks the whole day through.

*****

Thus did a week slide smoothly by
Nor none had cause to breathe a sigh.
Some Johns were heard to contemplate
That to them the life was great.
They looked ahead with joyful eyes
To the day they'd have horse exercise.
Old timers knew it would be a sight
To see these rookies take a hike.
With silent mirth the old boys waited
For the dawning of the day just stated.
Then early one Sunday 'ere the day had begun,
A horse was given each bloomin' one,
To nourish and cherish and take good care
And see that he always got his share.

*****

So days had passed without a hitch,
Though some of the Johns got the "Dobie Itch;"
But that was a "skemption" if they but knew
Their troubles had only begun to brew.
The first day at horse exercise,
Their talk of joys brought mournful sighs.
The old boys laughed, but the rookies swore
When they found that riding made them sore.

All they heard was "Trot, Trot, Trot,"
It seemed their saddles had grown red hot;
And as they trotted around and around,
Many wished they were homeward bound.
Already their joys had gone to wreck;
Some had dreams of a broken neck.
T'was great relief to seek their bunk
After such a day of useless junk.
But in their bunks not long they waited,
Because a school was instigated
To teach the boys Electricity
Was good for their efficiency;
So every day to school they went;
And thus the afternoons were spent.

*****

The teacher taught the volt and Mho
And lots of things they did not know.
He said he'd prove Electricity
Was nothing but Simplicity;
But 'ere he'd proved his words were true
The teacher to a Captain grew,
And though they wished that he might stay,
He took a ship and sailed away.
And thus all good things must cease;
So did the school to the great relief
Of all concerned: For "Now" says they
"In the afternoons we shall hit the hay."

*****

But the kindly Skipper looked about
And had the students all turned out.
Says he "Tis now in time of war,
This is no time to sleep and snore;
Fence off a little grassy plot,
'Twill make a dandy garden spot.
Dig out the stones, hew down the shrubs
And plant therein some beans and spuds."
Some fell out with spades and tools
While some fell out and got the mules.
And now the students drill and toil;
From day to day they till the soil;
They drill and work the whole day through
And smile while eating beans and stew.
They've learned to ride: They've learned to plow;
The rookies that were are soldiers now.

9CF IS IN THE SERVICE

Dear Editor:

I hope you will excuse the personal letter but I would like to have a few words with you in regard to the U. S. Naval Reserve. I fail to see why any REAL amateur operator should not enlist in the service. To anyone who has the great desire to keep in the business and do a good turn for UNCLE SAM I would say "Enlist and do it now." While as I understand it, they are not taking any more amateurs for duty on land but for active service in "Class 2" which is sea duty, there is the chance to do some real work and get the best training and experience that is to be had anywhere. Personally, I would not give up the experience that I have gained since enlisting for anything. I am stationed at present at the Marconi station at Duluth, Minn., but hope to be transferred to sea soon. While the work here is not very exciting, it helps in a way to take the place of my station at home. I am a constant reader of QST and with great regret notice the decrease in size, but can readily see the reason for it.

Wishing you every possible bit of success for the future of QST and the A. R. R. L.,

Sincerely yours,

H. R. Hall 9CF

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RADIO CLUB OF TACOMA

The Radio Club of Tacoma elected officers as follows to hold office for the next six months: A. Stenso, President; H. G. Reichert, Vice-President; Norman J. Arndt, Secretary; Nevelle Benoit, Treasurer; and H. D. Longmire, Associate Secretary.

Altho the Government has closed up our stations, we still hold regular meetings, which are marked by good attendance, and are delving into the deeper side of the radio art. Some of the amateurs, including myself, are constructing Tesla coils, thereby using some of our spare time to good advantage, which might otherwise be spent in sad reminisence of the nights when we strived to hear that distant amateur's call or inwardly cussed that latest addition to the QRM ranks in the next block.

We are contemplating having code practice at speeds of five, ten, fifteen and twenty words a minute at our meetings, giving those who are slow receivers a chance to work up speed and preventing the others from becoming stale.

We shall be glad to hear from other amateurs and clubs, which communications should be addressed to Norman J. Arndt, Secretary, address 110 1-2 South 14th St., Tacoma, Wash.

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THE DECEMBER REGENERATIVE SET

Being a brand new subscriber to QST (thro Mr. Carl Linxweiler of Dayton, O.) I thought it only fair to show my appreciation of your publication by giving my experience with the small regenerative set described in the November or December issue. Mr. Stanley Copp, (8LT) of Dayton, Ohio, suggested that I build one of these sets, and I did so.

The results were positively wonderful, and, in fact, I never thought such amplification possible.

On the night of March 14th (using "T" audion and 2,000 Brandes phones) I heard the following stations 9XM two feet away): 3PC, 4BY, 5DU, 5ZC, 8AIR, 8AMN, 8LT, 8LE, 8NH, 8OH, 9LH, 9LR, 9JI, 9PC, 9WG, 9XM, 9ZF, 8ALE and about ten or twelve others, all very loud.

I heard Mrs. Candler (8NH) of St. Mary's, Ohio, ten feet from the phones, so you can get an idea of how loud the others were. My suggestion to all the other amateurs would be, "build one yourself, and see" because, if you follow the "blue print" exactly, you are bound to have success.

Cincinnati has usually been somewhat closed to the outside world. judging by what some of the other fellows say, but not for me any more.

John E. Fox

I forgot to mention my own call, which is 8IV.

*****

WIRELESS OPERATORS

Operators in North Florida, Georgia, and South Carolina who desire to enroll are requested to communicate with the "Communication Office," Navy Yard, Charleston, S. C.

EUREKA COLLEGE HAS COMPLETE WIRELESS STATION

A complete wireless station has been installed at Eureka College, Eureka, Illinois. The station is to be used for experimental and training work. A special license has been obtained and the call letters are 9YQ. (420 metres.)

The sending equipment consists of a one kilowatt Thordarson transformer, 250 cycle rotary, oil immersed condenser and other standard apparatus. For receiving, audions and tron tubes are used in connection with short and long wave couplers. A special long-wave undamped receiver is being installed at present.

Anyone hearing the call letters 9YQ will do us a favor by writing Alvin C. Spencer, Eureka, Illinois. The station has been installed and is operated by the above operator, formerly of 9LJ.

*****

PACIFIC COAST WORK

I take great pleasure in reading your magazine each month, and I think it surely gives us the facts. I want to congratulate you.

I am located in Burlingame, California, 20 miles south of San Francisco. My call is 6WZ. Last night at 11 o'clock I clearly heard a station signing 9AMT. The tone of the spark was wonderful, and the signals did not fade. I can't find this fellow's name in the call book, and I would like to let him know. He was talking to 5AB.

I have been heard by the following stations: 6DM, 6UP, 6EA, 6AAG, 6ZW, 6AV, 7SL, and 7ZN. I hear all these boys OK.

Hall Berringer

*****

UNUSUAL RELAYING

Wish to call your attention to a condition in handling relay work that happened on March 30th, about 2 a. m., which I think you and your readers of QST—those that were not on watch at that hour—will be interested to know.

Conditions were such that 8NH had messages from the second district for 8JZ. The latter could not hear 8NH, so he asked for help from the second district through 2 PM.

There another condition prevailed. 8NH could not hear 2PM. So the business was handled this way: 2PM told 8JZ to tell 8NH to GA, which when done enabled 2PM, after a few checks from 8NH through 8JZ to QSL message.

You will note that the said message is now back in the second district where it started from.

From 2PM, it was given to 8JZ and QSL received, after which all of the three stations said GM.

L. Spangenberg
73. 2ZM

Air Service In War

Concluded From Page 14

the watchfulness of the allied air fleet with disastrous results to humanity and property.

All aviators and balloon pilots become officers in the aviation section of the Signal Officers Reserve Corps of the Army immediately upon graduating, being commissioned as first lieutenants with a base salary of $2,000 annually and additional compensation when in active service at home and abroad.

THE "KITE" OR STATIONARY BALLOON

The usefulness of the "kite" or stationary balloon is not generally known. One familiar with its employment says that at the balloon schools, an applicant for officer's commission must first qualify as a pilot of spherical balloons. Then they are taught to become pilots and observers in the "kite" balloons

This balloon is allowed to ascend to a height of about 3000 feet with a wire cable attached to it by which it is drawn down when desired by motor power.

In war, these balloons are located from three to five miles from the first line of trenches, and from the basket two men, a pilot and an observer, give the range and result of firing by telephone to the artillery.

On the western front they are placed from one-half to a mile apart, according to conditions, and are provided with parachutes attached to the men in the basket; in event of accident to the balloon the men parachute safely back to the earth.

FOR SALE & EXCHANGE

FOR SALE—Complete 1½ inch Spark Coil Sending Set, and 3000 Meter Receiving Set; also two Storage Batteries. Walter J. Schneider, R. R. No. 2, Mason Road, Hamilton, Ohio.

FOR SALE—One EXPO watch camera complete as new, value $3.00; and one printing press, value $3.00. First reasonable offer takes them. G. Holmes, Hastings, N. Y.

FOR SALE OR EXCHANGE—Good motorcycle, running order, for Thordarson transformer, 1 kw. I have one combination long and short wave regenerative set without audion, $25., couplers, switches, coils, condensers, wire—all sizes—1-40,000 meter loading coil, $5. All answered. H. F. Dildine, 526 So. Race St., Van Wert, Ohio.

FOR SALE—One daylight loading premo junior camera, size 2¼ x 3¼. First $1.50 takes it. All letters answered. E. V. Edwards, 1425 N. 31 St., Richmond, Va.

FOR SALE—Audio-Tron double filament bulb, never been used, tuning coil, 3000 meters, detector, fixed condenser, switch, slide condenser, Murdock phones, 1-2 kw. transformer, helix, gap, electric whistle, 8 pounds of copper, No. 14, 7 copies of QST, also four cameras and complete printing and developing outfit. Cash or exchange. Al. R. Leavitt, 13 Grant St., Natick, Mass.

WHAT AM I OFFERED in cash for a hand operating Omnigraph with dials, valued at $2.50. Albert V. Abelin, 249 Elder St., Brooklyn, N. Y.

FOR SALE OR EXCHANGE—1 brand new, never used, double filament, improved type Electron Relay; one 1-2 H. P. light weight gasoline engine, one type SS dynamo motor; 1 General Electric type 110 volt DC fan motor; 1 pair of 2000 ohm "Red Head phones; 1 1-2 H. P. water motor; 1 home made step down transformer, 4 volt steps from 4 to 40, can take 27 amps from secondary at 4 volts 15 at 8 volts, size of core10 inches x 8 inches; wire; belts; buzzers; electric lights, etc. What am I offered for same? Write for other bargains. R. R. Grimshaw, 6 Port St., Pulaski, N. Y.

FOR SALE OR EXCHANGE—Have a "Willard" storage battery, 8 volt, 42 amps capacity. Will exchange for 4 sections Murdock copper sheet moulder condenser with rack for same. Will sell for $10.00. Will consider good Tesla coil or other high frequency apparatus (nothing home made wanted). Atlee Gulledge, Fort Pierce, Fla.

FOR SALE—1 3 horse power motorcycle engine, very good condition, $12.00; 1 4 horse power engine, has fan attached for cooling, good condition, starts with crank, $18.00; 1 3A folding brownie camera with tripod, good as new, only $9.50; 1 good Superior receiver, $1.00; about 50 copies "Popular Mechanics," $3.50. Write me. Glen Decker, Ligouier, Indiana.

AM SELLING OUT and have the following for sale cheap: $2.95 antenna switch, $2.25; $1.75 telegraph sounder, 200 ohm, $1.00; $3.00 telephone magneto, $1.50; $2.25 galena catwisker detector, $2.00; 3 55 cent induction coils, 30 cents each; $1.95 bell ringer, $1.25; 2 wet battery jars with carbons, 75 cents; 3 inside carbons, extra, 50 cents or 20 cents each. Everything is in perfect condition, guaranteed working order and some are even brand new. Adrian Kishpaugh, R. D. No. 2, Newton, N. J.

WANTED—Two sections of Murdock transmitting condenser. Will pay cash. Address to A. Hautmann, 21 Vine St., Pittsburg, Pa.

FOR SALE—A complete receiving set, consisting of a loose coupler, detector, variable condenser, fixed condenser, loading coil, $6.50. A reactance coil, $1.00. A 25-35 calibre Winchester, repeating rifle, $12.00. A 1 inch spark coil, $2.00. A Murdock loose coupler, $4.50. Viplex double speed key, $4.50. A 500 foot, No. 14 wire 2 wire aerial, $4.75. A Eugene Dietzen drawing set, cheap. These articles in good condition. All letters answered. Ted Hopkins, 2223 Oakes Ave., Everett, Wash.

FOR SALE—Cabinet set consisting of Blitzen tuner, variable, oscillation coil, audion and amplifier. No transformer, broken 1ound bulbs. Switch points, coils, cabinets and wire. Any reasonable offer considered. McMurdo Silver, 264 West 57th St., New York City.

WANTED—Will trade the above set for either of the following Colt powder and ball pistols: Walker model, 44 calibre; Texas model, 34 calibre, concealed trigger; Old Model Army, 44 calibre or any three different pistols of any make stamped "C. S. A.," usually with brass frame. Will give full particulars of set, also of pistols, if wanted, for stamp. McMurdo Silver, 264 West 57th St., New York City.

UNUSUAL VALUES for prompt disposal. Large drill press, 2 speed hand drive, 3 speed automatic and hand wheel feed, $7.50; 6 inch Red Devil water motor, new, $3.00; Cyclopedia of Engineering, 6 vol., $6.00; 9 Eveready No. 703 electric flashlight batteries at 10c., $0.90. All inquiries cheerfully answered. J. A. Wever, 238 S. Patterson Park Ave., Baltimore, Md.

FOR SALE—$9.00 Radioptican, good as new, complete with 175 postcard views, and a 5x7 foot screen, $7.50; or will exchange for Goodell amateur bench lathe. A $10.00 Millers Falls companion foot power lathe with equipment, $6.00. Also a $3.00 scroll saw attachment for same, hardly ever used, with equipment, $2.50 delivered. About 15 boys' books, cheap. Write for list and prices. **WANTED**—1-16—1-5 H. P. 110 volt, AC motors, and raw materials, switch points, wire, etc. All letters answered immediately. Address Harry Wilcox, Jr., 147 Oakland Terrace, Hartford, Conn.

WANTED—A 1 KW. Marconi or United Wireless open core transformer, 110 v., 60 cycle. Harry Weber, 1113 N. Walnut St., Canal Dover, Ohio.

FOR SALE OR EXCHANGE—$1.30 Ameo. galena detector (new) for $1.10; E. I. 2 slide tuner, $1.00; Turney resonator (new) $.65; marble base detector, $.75; loading 200 meter coil, (12 taps) $1.50; small helix, $.35; rotary spark gap, $2.50 and 34 inch loading coil (5 inch diameter wound with silk covered wire, cost $8.50, has never been used, $5.50. All in fine condition. Want section of Murdock sending condenser or GOOD crystaloi—or what have you? Write Robert M. Curts, 581 East 25th St., Paterson, N. J.

FIRST CHECK OR MONEY ORDER—I will send express prepaid a new type Thordarson Transformer, 1KW. never used, only bought last month from dealer in Chicago direct. Paid $30., will sell for $25. Also a first-class O. T. Transformer, Adams-Morgan Pan Cake Type for $3.50. **WANTED**—A Paragon RA6 Regenerative Receiver with seals unbroken. Will pay cash. Please write. All letters answered. Chas. Fucci, 606 Henderson St., Jersey City, N. J.

WANTED—10 to 30 ampere commercial sending key. State condition and manufacture. B. W. Nestlerode, care of Y. M. C. A., Sioux City, Ia.

FOR SALE—9HN 1KW. transmitting set minus transformer. Set includes rotary gap, variable oil immersed condenser, oscillation transformer, all mounted in oak cabinet. Set has transmitted 900 miles. Complete description and photo furnished on request. Also have panel regenerative receiving set, Navy type coupler, Blitzen loading coils, and mounted Packard transformer. Further information and photos on request. J. A. Crowdus, 5047 Washington Ave., St. Louis, Mo.

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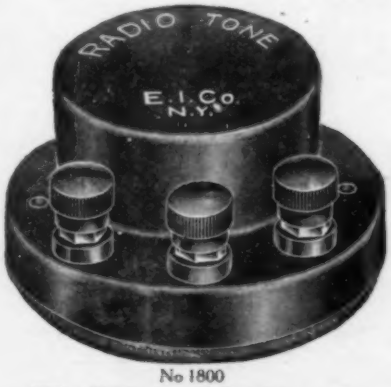

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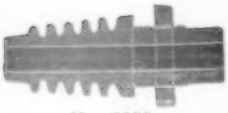

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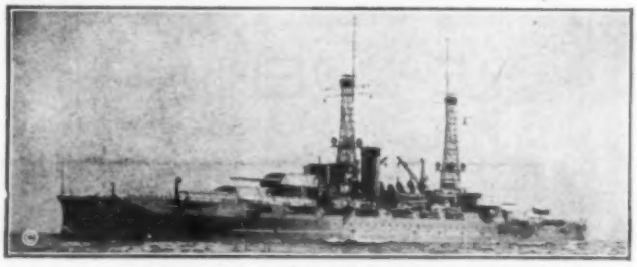

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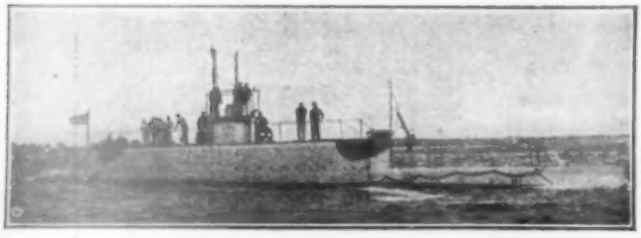

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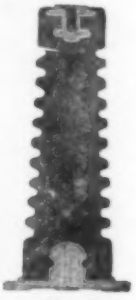

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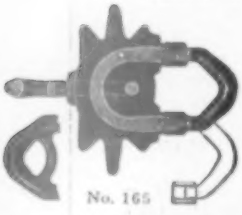

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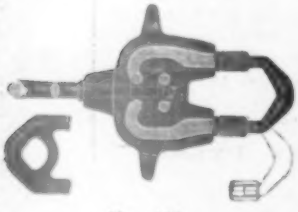

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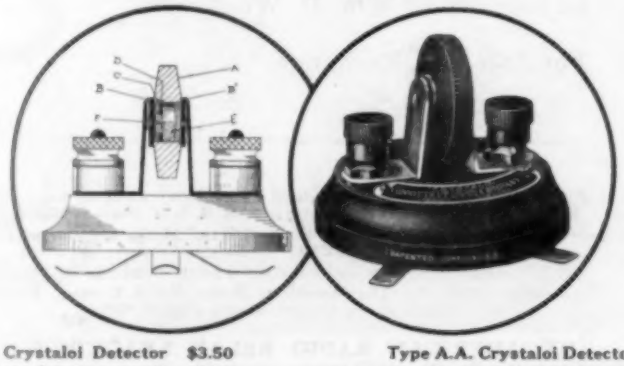

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A Magazine Devoted Exclusively to the Radio Amateur

New Developments

By Dr. Radio

Those who have been closely connected with the subject seem to be generally of the opinion that among the foremost radio war developements is the work done in vacuum tubes. The improvements have been a combination of new discoveries and constructions following a better understanding of old ones. To properly grasp the new things which have been done in vacuum tubes, and which are now available to the amateur, it is well to briefly pass over the history of the wonderful device.

In its original form, what we now call the Vacuum Tube was based upon what is known as the "EDISON EFFECT", the current or stream of electrons which flows from a hot filament to a cold plate in an evacuated vessel, and which resists flow from the cold plate to the hot filament. The possibilities of this singular characteristic of a hot filament were probably first recognized and made use of in radio by Dr. Fleming. Fleming called his device "The Fleming Valve". He developed it into a detector, making use for the first time, possibly, of the uni-directional current flow from a hot filament to a cold plate in an evacuated glass tube. The detector proved itself to be reliable, but lacked sensitiveness.

DeForest next appeared and announced his discovery that a third element might be introduced into the evacuated glass tube to advantage. He called this third element a "grid", because it took the form of a grid like construction made by bending a wire into the form of a grid. DeForest demonstrated that the potential of this grid with respect to the filament and the plate, could be made to control the amount of current flowing from an auxiliary circuit derived in practice from a bank of small dry cells and including the receiving telephones. Incoming electrical impulses placed alternating negative and positive charges on the grid which caused a large DECREASE in the current flowing in the auxiliary circuit when the charge was negative and very slight increases when the charge was positive.

Thus the current from the auxiliary circuit passing through the receiving telephones was caused to flow in greater amount in one direction than the other. This caused a response in the telephone, naturally. The grid action was therefore said to be something like a trigger. It released uni-directional current through the telephones enabling them to produce an audible sound for very small amounts of energy coming in by the antenna.

This improvement of DeForest tremendously increased the sensitiveness of the Fleming Vacuum Valve and made a very wonderful radio detector. At the beginning of the war, the amateur had made use of it to great advantage. Originally it was obtainable only from the DeForest Company, but later other makers produced tubes which the amateurs used. Still later, amateurs made use of regenerative circuits made possible by the vacuum tubes and also of amplifying circuits which still further increased sensitiveness.

In the early days of its use, the Vacuum Tube was found to be very irregular and

fickle in practical use. Some bulbs would be extremely sensitive and others would be very insensitive. Some would require high potential in the auxiliary or plate circuit and others would not stand a high potential. Extremely critical adjustments were necessary in filament brilliance, and plate circuit potential. Some bulbs would acquire a blue glow and would "paralyze" and become inoperative as a detector at the slightest variation of adjustment. They were usually termed "hard" bulbs or "soft" bulbs. All amateurs are probably very cognizant of these aberations of the early DeForest audion.

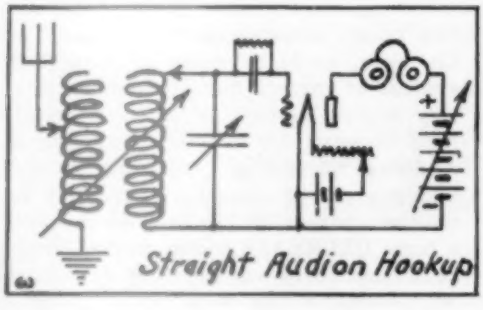


Fig. 1.

When the war came radio requirements demanded tens of thousands of detector bulbs which should be sensitive and reliable in rough usage. No fickle or delicate potential adjustments could be permitted, but on the contrary a bulb was necessary which would be sensitive and reliable at a standard filament brilliance and a standard plate potential. To accomplish this thing, the most painstaking analysis of the Vacuum Tube became necessary. One of the things investigated was the vacuum. It was found that this was very difficult to control. Varying quantities of varying kinds of gas were left in the bulbs after sealing. It was found that gas was gradually given off from the metal in the plate, and also the grid. Air was found to be given off the glass itself. In order to overcome these irregularities, it was found necessary during the exhausting process, to heat the bulbs and bombard them internally with a high potential discharge. This bombardment appeared to drive out the traces of gas occluded in the metal and glass.

Filament brilliance was investigated and it was found that when a filament is coated with a certain oxide, the stream of electrons is considerably increased so that a plentiful discharge is secured even at a very low brilliance. Bulbs have been seen operating by the writer which were so low in brilliance that it required careful observation to tell whether the filament was red hot or not. Low brilliance had the advantage of lengthening the life of the filament and rendering less exact the adjustment.

The physical dimensions of the grid and plate were also given careful investigation. Grids were made double and plates were made double. Two grids and two plates were connected in parallel on opposite sides of the filament, with improvement in stability. Tubes were constructed on lines worked out by the French in which a small helix is wound up into a grid and then surrounded by a circular plate.

Various other very interesting and complicated examinations were made, all under the most extreme pressure of war conditions. Later on, some of the wonderful work that was done by the experts will be told of, but at this writing it is not thought discreet to go farther.

The research work eventually produced a vacuum tube which was uniformly sensitive and reliable at 22½ volts plate potential and which was indifferent to any change in filament brilliance from a very dull glow to full incandesence.

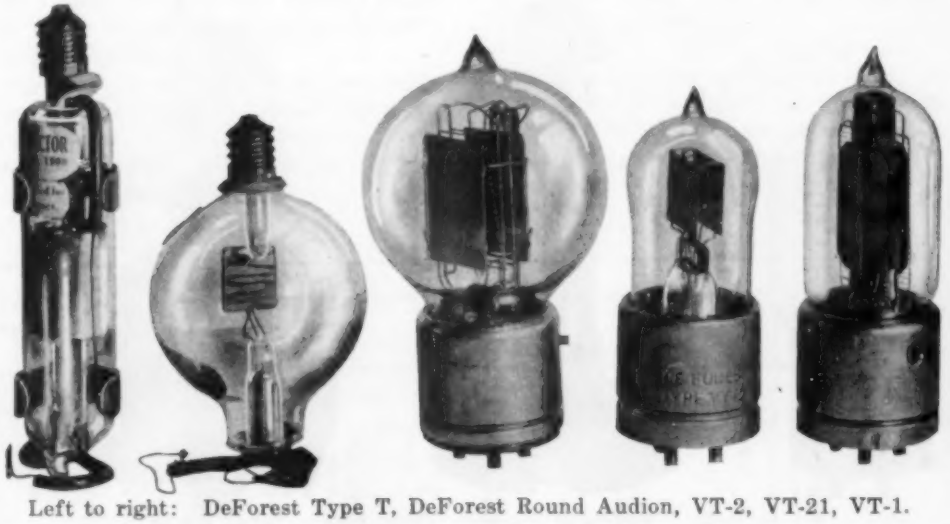
Amateurs will recall the extremely fragile external connections which were characteristic of amateur bulbs. This of course could not obtain in war service. Instead of fragile wires, the bulb was mounted in a brass base the same as an incandescent lamp was mounted. Projecting from the base were four prongs. Two of these were the filament terminals, and the other two were respectively the plate and the grid terminals. A special receptacle with a bayonet joint lock was provided so that all that was necessary to connect up a bulb was to press it down into a receptacle and everything is robust and firm and able to stand the unavoidable small abuses of every day service. Amateurs will appre-

ciate the great improvement which these bulbs will offer.

A matter which the amateur is especially interested in is that of the connections or "hook-ups" that war experience proved to be best. As far as the simple vacuum tube detector is concerned, the conventional "audion hook-up" was used (see Fig. 1), except that the small grid condenser was usually shunted with a high resistance leak of about one megohm (one million ohms).

In case of regenerative connections, they were mainly of two types:- The capacity feed back, and the inductive feed back. Both types have given very wonderful results on long wave reception. The inductive feed back seems however, to be preferable on short wave lengths. Diagrams of the two types are shown at Fig. 2 and Fig. 3.

For the reception of undamped signals of long wave lengths, either the capacity feed back or the inductance feed back can be used with success. For the benefit of those who may want the information, it can be said that the inductance values of the coils should be for the primary, about 75 millihenrys, and for the secondary and also the plate inductance, about 150 millihenrys. These with the average amateur antenna or loop will handle wave lengths up to at least 16,000 meters. The con-



Left to right: DeForest Type T, DeForest Round Audion, VT-2, VT-21, VT-1.

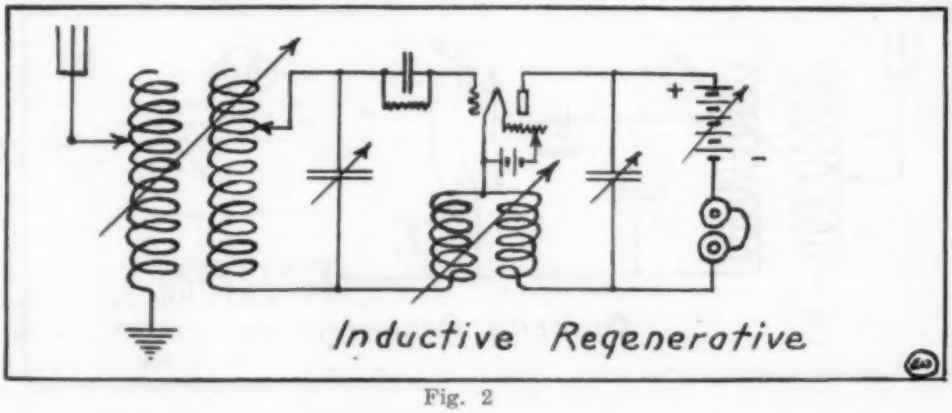
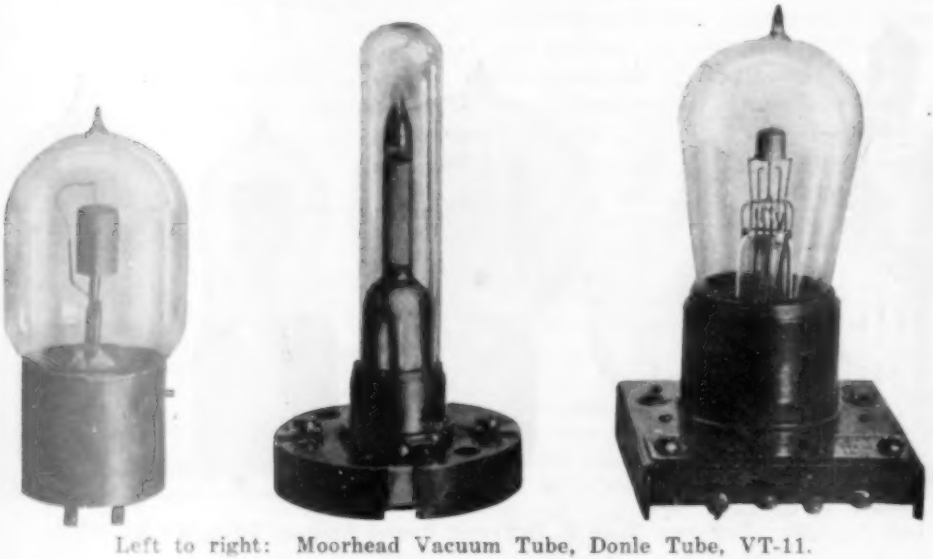


Fig. 2

densers can be the ordinary variable type used by amateurs generally.

When it comes to the use of the vacuum tube for amplification, we find that the improvements made during the war have vastly altered the possibilities in the way of amplification of weak signals. Amateurs in many cases have had experience with audion amplifiers and they know that any amplification above two step was fraught with many practical difficulties. This is all changed now with the new vacuum tubes that are available. For frequencies within the range of audibility, amplification to the extent of four and five steps is entirely practical. For amateur service, where a personal interest and great skill and patience frequently exists, a six step and even more might be considered practical with modern tubes. The effect of this degree of amplification is probably destined to be very great in amateur radio, because it permits the reception of extremely faint signals and has an influence upon the necessity for powerful transmitting apparatus. Many amateurs will question the necessity for an expensive mast and a full one kilowatt transmitter, if a station two hundred to five hundred miles distant is able to hear signals transmitted from a thirty foot antenna, and one-half kilowatt power.



Left to right: Moorhead Vacuum Tube, Donle Tube, VT-11.

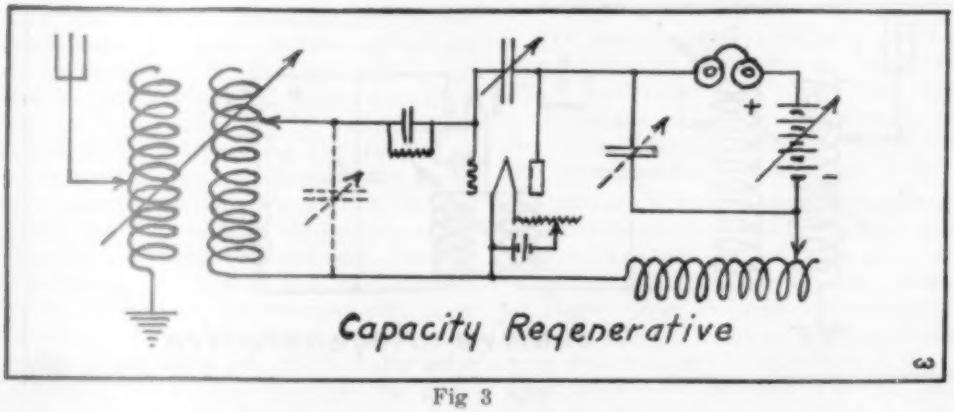


Fig 3

An example of interest in this connection is the British efforts at locating the German submarines. It is said that these submarines communicated with each other by very faint signals sent out from simple buzzers. Only nearby receiving stations could of course read these signals. The British Admiralty, so it is said, set up a forty-step amplifier on shore, and not only were able to read the faint buzzer signals, but were able to locate the direction whence they came.

The question of loop antennae is closely related to this subject of amplification, but consideration of it will be reserved for a later time. It may be said in passing, that

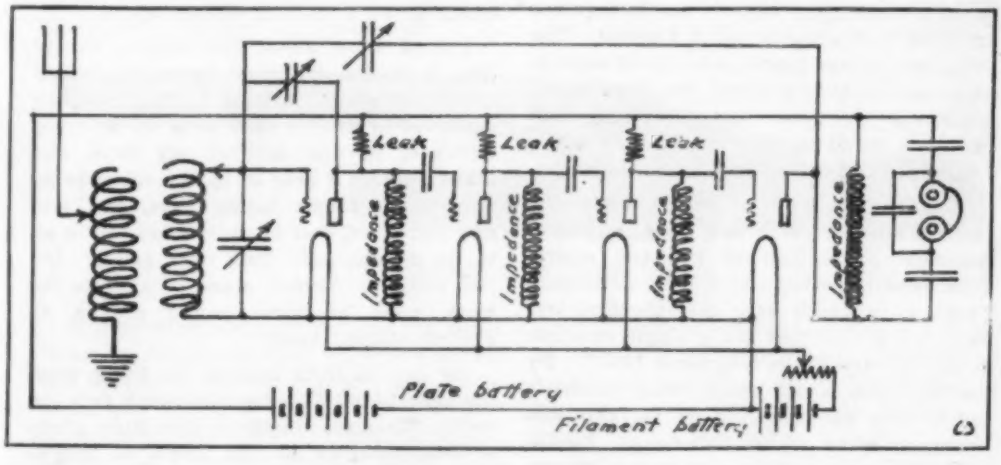


Fig. 4

if very high amplification is possible and practical, there is a question whether there is necessity for an outside antenna of the old type. If a loop set up in the room with the receiving instruments, is all that is necessary for both transmitting and receiving, amateur wireless communication becomes a very different proposition than has been the case in the past.

In closing, a word should be said about the work that has been done with modern vacuum tubes operating as radio frequencies amplifiers. The French have done a great deal in this line. A diagram of the connections used is shown in Fig. 4.

Performance of this connection is extremely sensitive and shows great freedom from static interference. It tunes extremely closely and gives very intense signals. Of coarse, even after the four steps of radio amplification it is possible to continue the amplifying by the use of audio-amplifiers. There seems to be no limit to the degree of amplification.

The factor of this high amplification is of great importance to the amateurs. It may mean that we shall use low powers with high efficiency for transmission. Assuming we can emit sharply tuned waves and depend upon critically tuned receiving with high amplification, it appears possible to increase greatly our working radius and eliminate much QRM.

This preliminary article suggests lines of experiments for amateurs. In future issues of QST the writer hopes to explain more in detail the results which may be obtained on long wave reception. This occasion is used to point out that there are many readers of this magazine who are in a position to materially help in broadening these discussions, and they should be encouraged to come forward.

Rotten Starting

By "The Old Man"

Rotten Starting is one of the Old Man's best. It will cause as many laughs as a forty-step amplifier boosts the signals. Regenerative laughs, fellows. No one but the Old Man could cause them. Read and laugh. —Editor.

Say Son, this here wireless game brings on a heap of rotten stuff, it seems to me. When we got the word out here that receiving was allowable, you would have thought the Town Hall had caught fire. All concerned simply dropped business, and proceeded to beat it somewhere. It seemed to be a unanimous vote to hustle together anything that would bring in a signal. The little wife in our family, who never expected to see amateur wireless practiced again, made up her mind that something had busted in the attic, what with all the haste, excitement and noise when I got into action.

What a lot there is to do when the restrictions on receiving are suddenly removed. And just to get one mimsy little weak underfed whine from Arlington. That's all anybody ever gets the first try. Say, is it a fact that every single amateur in the country has moved since 1917? By the dust you would think every Mother's son of the bunch had done so, and was trying to make up the handicap. Everybody I know is building from the ground up. You would swear there never had been an amateur radio station in the whole darned country the way folks are digging holes, stringing wires,and burying chicken net. Where in time is all the old stuff, anyway, and has everybody given up the friendly tree and decided to put up a mast?

The head of our big hardware and electrical supply store told me the other day that if this wireless business kept up another two weeks, there would not be a pound of copper wire, nor an insulator, nor a dry cell, nor any solder, nor soldering paste, nor rubber tape left in the wholedam country. He was sending away to Chicago every ten minutes in the day for more soldering paste, he said, and was wondering whether the amateurs were painting their shacks with it, or eating it on bread, or what. (For a fact, isn't it funny how we amateurs do eat up solder and soldering paste!) He reckoned that if the wireless boom took hold throughout the country as hard as it was taking hold in these parts, that there was going to be a million dollars spent.

I dont know about the million, except that it would build a powerful lot of amateur stations judging by the economy practiced in some I have seen. I do know however, by the feel of my back and shoulders that a heap of hard work is being done these bright spring days, and also and moreover, that there is a heap of it all to be undone and done over again. It's just rotten to have to stand by and see the work some of these young squirts do getting started again.

No two of them look at the thing from the same slant. One excitable gink gets the word, explodes, alights in the attic, grabs a loose coupler in one hand, a crystal detector and a hank of wire in the other, and beats it for his sleeping room. Then he climbs out the window and crawls around on the clapboards on the side of his house like nothing human, and while you turn your back to hunt up something to sit on, he has shifted to a neighbor's tree, where with a rope in his teeth, he is shinning up as though his young life hung on the time it took to get to the top. In fifty-six minutes and thirty seconds by the watch, he has a wireless telegraph station set up, a tear in the seat of his pants that is beyond hope, a strong smell of perspiration on him, and is crouched up in a hard knot over a piece of galena trying to find the sensitive spot while hollering orders to the by-standers to "keep quiet".

Another specimen gets the glad news, calls Jim on the phone and asks him if the officially signed letter from the United States Navy Department is O.K., and after securing Jim's super-official approval of the Navy Department's action, proceeds to pull out about seventy-five pounds of Mesco, Duck, Adams-Morgan, Clapp-Eastham, Sears Roebuck, and DeForest catalogues. Not satisfied with these, he also hauls out a basket full of old QSTs, and after selecting the ones containing the article by Godley and the article on how to make the regenerative receiver, he proceeds to scratch the favorite spot on his head while he reads with care and precision every word of some funny yarn that attracts his eye. Judging by appearances, he will have something to listen to about the same time that the Peace Conference reaches an agreement.

THE ORIGINAL WOUFF HONG.

Still another young thing gets the news, blows up, hollers his head off to his mother and sisters, explaining how the new modulators and V.T.'s work, tells how they will all be listening to Nauen, Lyons, Honolulu, Japan, San Francisco, Buenos Aires, Cape Horn, and the South Pole just as soon as he can get time to hook things up, and then hurrys to the telephone makes a date with a girl and hustles off to the movies.

Another one gets the tidings over the phone, returns to the family circle with a distrait air and a far away look in his eye, induces a suspicion on the part of Mother that bad news of some kind has come, strokes his chin to stimulate his brain action and rises and proceeds in silence and sadness to the back yard where he gazes hard at the roof of the house. After scrutinizing with minute care each brick in the chimney top, he goes around to the front yard where he does the same to the front chimney. After shaking his head sadly, he returns to the back yard and repeats. He ends up by having a ten minutes stare at the tall tree in the rear of the next lot but one. This poor devil had "mastitis." He has moved since 1917, and he needs a mast, and it's a rotten mean need to have.

Yours truly is in the same boat with the last mentioned guy, on account of having moved about a year ago. The first thing that bumped into me after I caught fire was this mast business. I have graduated from the tree class, and nothing short of eighty-five feet will keep me awake. Being unable totally to make up my alleged mind regarding a mast, I turned my attention to the ground matter. There is a good deal to be said on this ground business. Some think an acre of chicken net is the only ground that will attract signals and repel static, but there were good and sufficient reasons why I should not attempt to plant an acre in chicken net. For one thing, it meant a lot of uplift work, consisting of lifting the sod off an entire grass plat. I took the wire ground route figuring it would be a cinch to run a series of little narrow grooves in the soft turf, poke down a lot of wire and tread the soft turf back. Then by driving down a dozen or so ground rods and soldering on the wires, I would have an A No. 1 ground that would pass inspection by both Final Authority and Radical. It listened easy. The listening was the only easy thing about it however. Some people may be able to run a series of little radiating narrow grooves in the soft turf with a jacknife, but I am not one of them. I tried jacknives, kitchen knives, carving knives, butter knives, can openers, forks and spoons. Finally, the little girl, who helped, went into the wood shed and came back with the family hatchet. Aged twelve, she put down a slot ten feet long, and four or five inches deep, while I was pulling off suspender buttons, making one

a yard long and two inches deep with a mason's trowel. From the hatchet, we graduated to the axe, and with the latter, we ran the series of little radiating narrow groves in the soft turf.

When these were run and my backbone beginning to feel like an over charged condenser, we started poking down twenty-four No. 16 strands of copper wire. If anybody has never poked twenty-four strands of No.16 copper wire down into a series of little radiating grooves in the soft turf, let him take a crack at it after a hearty meal. It will cure him of wireless or it will kill him. I found it a long, long way to Tipperary, believe me. I felt when I had finished that I had laid the Atlantic cable in the back yard. When I get over this, I don't expect to walk the same, but I shall be in a position to enjoy the old pipe while I reflect upon the easiest and cheapest way of getting up a mast that will hold a few wires about eighty-five feet in the air. I am told that there are plenty of rotten things lurking in the background of this job also. In the meantime, while I am regaining my health, I am sending you a specimen of a real live Wouff Hong which came to light out here when we started to get our junk out of cold storage. Keep it in the Editorial sanctum where you can lay hands on it quickly in an emergency. We will be allowed to transmit soon and then you will need it.

Well, So Long and 73 all around. C U next QST maybe. G N - S K.

List of Long-Wave Stations Heard at Rockville Centre, L. I.

This list was prepared by Mr. J. O. Smith, Traffic Manager of the American Radio Relay League, and all of the stations were copied by him at his station at Rockville Center, Long Island, between April 15th and May 1st.

The following list of long-wave stations, with their locations, characteristics, wave lengths and calls, has been prepared for the readers of QST who may be interested in long wave and long distance receiving.

Call	Wave Lengths	Location	Characteristics
XDA	4,000	Mexico City, Mexico	Spark Set
GB	7,500	Glace Bay, Nova Scotia	Spark Set
NWW	9,800	Tuckerton, N. J.	Undamped
OUI	10,500-15,000	Eilvese, Germany	Undamped
IDO	11,000	Rome, Italy	Undamped
LCM	11,500	Norway	Undamped
NPM	8,100-11,000	Pearl Harbor, Hawaii	Undamped
UA	11,500	Nantes, France	Undamped
NDD	9,200-13,600	Sayville, L. I.	Undamped
POZ	12,600	Nauen, Germany	Undamped
NPL	9,800-13,000	San Diego, Cal.	Undamped
NFF	13,600	New Brunswick, N. J.	Undamped
MCI	14,000	Carnarven, Wales	Undamped
YN	15,500	Lyon, France	Undamped
NSS	16,900	Annapolis, Md.	Undamped

As a matter of general information, the receiving antenna consisted of two wires, each 350 feet long, running east and west, thirty feet above the level of the ground, and the receiving was done on a Godley 200-20,000 meter set, using one detector and two amplifiers, with ordinary DeForest amplifier circuits.

The Famous VT-1

By K. B. Warner

To those of us who were in radio work in the war, the term "VT-1"will always awaken memories. VT-1 is the official designation of the receiving tube used by our Air Service, Signal Corps, and Navy (being also called CW-933 in the Navy), and probably a brief description of its characteristics will be of interest to those of us who have not had personal acquaintance with it.

The VT-1 is a highly standardized receiving tube, manufactured by the Western Electric Co., and as will be noted in the illustrations elsewhere in this issue, is an elongated tube mounted vertically on a 4-pole bayonet base, and having overall dimensions of 1-3/4 inches by 4-5/16 inches. This tube is capable of performing all the desired functions of a receiving tube, being equally adaptable to detecting, amplifying, or oscillating for autodyne reception of continuous waves. Being intended largely for airplane use, where the vibration is extremely severe, it was necessary to design a tube mechanically strong, and a very ingenious arrangement of the metallic parts has been devised, resulting in the practical elimination of breakages from that source. Double plates and grids are used, on each side of the filament, which is in the form of an inverted V. The plates are corrugated, which in addition to providing increased surface, strengthens them. Connecting the plates at the top is a small lava block, from which the tops of the two grids and the filament are supported.

The filament is of novel construction in that, instead of being of tungsten or similar metal and relying on very high temperatures for the liberation of electrons, it is of a less refractory metal, generally platinum, and coated with a mixture of oxides, probably barium and strontium, which have the property of emitting great quantities of electrons at moderate temperatures. The VT-1 filament merely glows a dull red, and its successful performance is at first a mystery to the operator who has been accustomed to reading his newspaper by the light of his audion. The oxide-coated filament has several advantages over

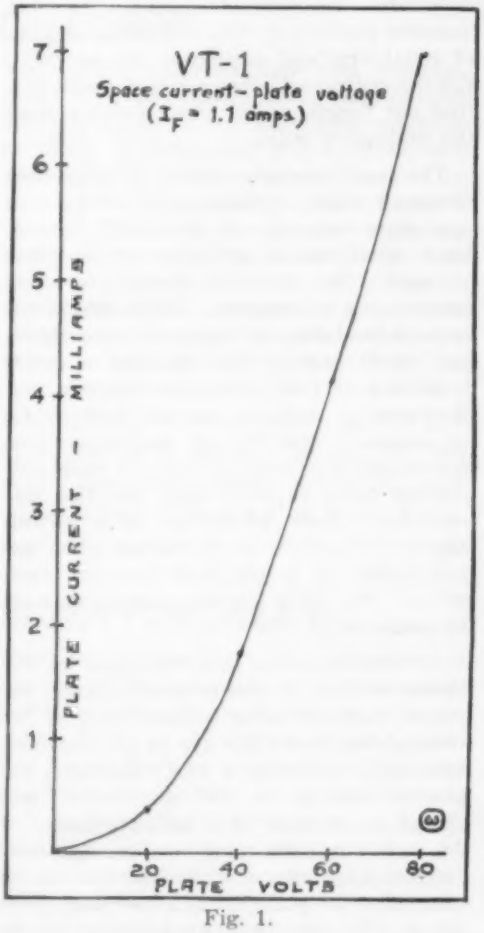


Fig. 1.

filaments such as tungsten, which must be heated to incadescence. Its life is longer, because the filament temperature is lower for proper electron emission. It is more reliable because slight changes in filament current produce less effect on its plate

current. Due to lessened filament evaporation, it maintains its operating characteristics nearer constant thru its life. Its operation is also more economical, for less filament current is consumed for proper electron emission than with tungsten filaments.

A very high vacuum is employed, with electrodes bombarded during evacuation to remove occluded gases, so that at working voltages ionization is wholly absent. This makes the characteristics of the tube definitely determinable, makes posible quantity production with absolute assurance of reliability, and eliminates the necessity for the critical adjustments that characterized our former tubes when working near the ionization point.

The result is a tube with a life of several thousand hours, reliable and constant in operation, rugged, and practically insensible to small variations in filament or plate voltages. The filament current for best operation is 1.1 amperes, but as this is not critical the tubes are operated on a standard 4-volt storage battery thru a series resistance of 1 ohm and give constant performance at voltages varying between 4.4 at gas-peak and 3.6 at discharge. The normal plate battery is a 15-cell flashlight-battery-rated at 22.5 volts, but this also may vary from 18 to 25 volts without appreciable effect on operation. The entire secret is in the high vacuum used, giving the tube definite and uniform characteristics.

In detection the tube operates on the lower bend of its characteristic curve, the upper bend not being reached even by the voltages employed for use as an amplifier. In circuits requiring a grid condenser, the proper capacity is 150 micro-mfd., and should be shunted by a leak resistance of 0.5 megohm. In amplification the tube functions on the straight portion of its curve and the plate voltage may vary from 18 to 100 volts, somewhat better results being experienced with the higher voltages. The Mu, or amplification factor (defined as the ratio between the change in plate voltage necessary to effect a given change in plate current and the change in grid potential necessary to produce the same change in plate current), is approximately 6.0.

Fig. 1 is a typical plate current—plate voltage curve, while Fig. 2 shows typical plate current—grid voltage curves at varying plate voltages, Curve III being suitable for amplification and Curve II illustrating the characteristics when using normal plate voltage for rectification.

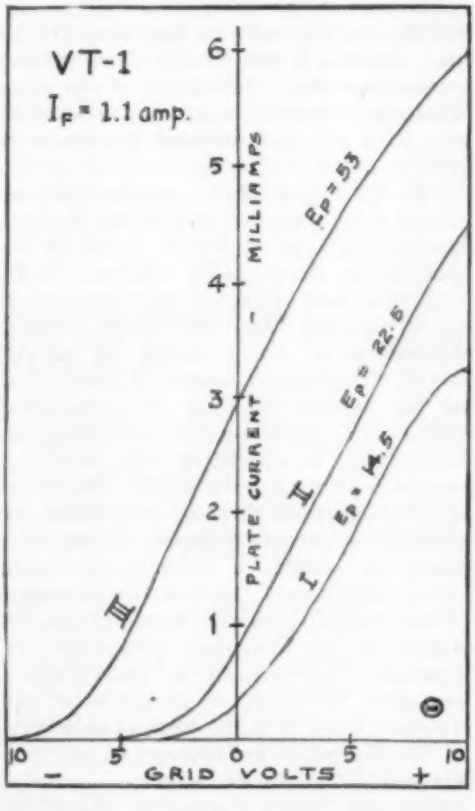


Fig. 2.

Characteristics of VT-1.

Plate voltage (rectification)	18 to 25
Filament voltage	3.3 to 3.9
Plate current at 20 volts (grid zero)	1 milliamp.
Filament current (normal)	1.1 amp.
Amplification constant	5 to 7.
Free grid potential at normal plate voltage,	-1.1

A. R. R. L. LOAN

In your tearing around trying to get a wire in the air and some kind of a receiving set in operation, don't forget our Loan. The whole thing hangs on it. We must have the money to get QST going again, and we must have a Headquarters office, and we must have paper, envelopes and stamps. In the beginning, it will take quite a little money and an awful lot of hard work to get the machinery running in harmony again. Our Board of Direction have an unlimited supply of hard work that they can give, but they need help in the case of money. This must come from the membership, not as a gift or donation, but rather as a loan until we can begin to make our organization self-supporting. Then, we shall gradually pay back the loan with interest, and wireless amateurs of the country will have their own organization OF AMATEURS, FOR AMATEURS, BY AMATEURS, and their own magazine in which to foregather and improve their knowledge and have a hearty laugh. That is going to be something well worth while, because Wireless is the next developement. Somehow or other, we wireless bugs seem to have a better fraternal spirit and a more highly developed sense of humor than other mortals, as our A.R.R.L. history has shown in the past. Let us keep it up, and let every fellow who has anything to loan from a dollar up come across with it and help the game along. He will get his money back with interest and he will have made himself a member of the A.R.R.L. family by so doing.

EXPERIMENTING SCIENTIFICALLY

In ye olden days, we amateurs experimented for results about in the manner that a blacksmith experiments. This old-fashioned experimenting was the sort where we thought it pure science to hook on three more turns in our primary circuit, and call up a fellow on the next block and ask him how it affected our signal strength. The day for that type of experimenting has passed. It was all right for the days of crystal detectors and three slide tuners and a helix, but now that every amateur has easy access to the clearest kind of explanations of fundamental radio principals, we must experiment more scientifically.

We all must learn how to measure inductance, and capacity, and the demon, "distributive capacity". We must be as familiar with wave meters and the measurements of wave length as we are with the code. Radio is getting more and more complex and if we amateurs are to keep up, we must think of these things.

A thing that is going to call for scientific handling, is our transmitting. We are going to be limited to two hundred meters, and a pure wave, and not more than two-tenths decrement, and the old hit or miss methods will not get us very far in the days to come. The moral is, to get busy, fellows, and own a wave meter and some other similar instruments and accustom yourself to using them.

RECEIVING PERMITTED

Amateur Wireless is to be resumed on the pre-war basis. There is no longer any doubt of it. Many of us have been skeptical for some months, but now all skepticism is swept into the discard, and we know we are soon to have our full old time Liberty.

The glad news that the restrictions on receiving were to be lifted by the Navy Department got on the telegraph wires on Saturday, April 12th. Immediately thereafter, telegrams began pouring into headquarters at Hartford, from all parts of the country. We received our own official notification on Sunday, the 13th, that on and after April 15th, 1919 the restrictions on amateur receiving were off, but that transmitting was still under the ban. The news caused an electrical impulse to instantly pervade the entire country. It was like the news of the Armistice. It seemed to fill the breasts of thousands of us with a wireless enthusiasm that had not been experienced for many a long day. Probably the definite official statement by the Navy Department that the restrictions on amateur transmitting would also be lifted as soon as the President of the United States announced that a state of peace exists, had a very material effect in encouraging this enthusiasm, because it was taken as conclusive evidence that the Navy Department was going to play fair with us amateurs after all and give us our liberty just as soon as the conditions warranted such action.

A meeting of our Board of Direction was called immediately and a large number of members met with the Board in New York on April 16th. It was some jollification meeting. The questions of the immediate organization of our membership, and the immediate resumption of QST, and immediate finance were argued and decided. A tremendous amount of work was laid out and delegated, not the least of which was the revising of the Constitution in order to meet the new conditions. Space does not permit the telling of the whole exciting story here, but it will be unfolded in due time, and all hands will be proud of the pep that was put into this job, because as a matter of fact, we were all caught napping. We can safely say that amateur wireless in the good old USA, is to return in its full glory, and that not only the old crowd, but a lot of new ones from the Army and Navy will soon be getting together in the air, as in those glorious old days before the war. QST will be issued regularly from now on.

NEW DEVELOPMENTS

It certainly seems like old times for the Editor to be seated before the old typewriter with his legs twined around the chair in the same old twist, and pounding out editorial comments upon an article by such an old timer as Dr. Radio. The old crowd will all remember him and his simple and sane way of presenting the vital points of a technical question. This time he writes in his usual fashion on some of the NEW DEVELOPMENTS in radio apparatus which were brought out as a result of the war time requirements, and which may be made use of by the amateur. He bears particularly in mind that we are allowed to receive only, thus far. It is clear however, that a great deal of the apparatus used in receiving bears a very close relationship to a lot of transmitting apparatus. For example, bulbs are used for both receiving and transmitting. We have always felt that this mysterious little piece of glass possessed latent possibilities, when we first were induced to use it in place of a crystal detector. The DeForest Company was our sole source of supply in these first early days, and everybody must remember the little globe shaped audions. Little did most of us realize that those little audion bulbs that we used to fight over were the forerunners of the wonderful vacuum tubes that Dr. Radio tells about in his interesting manner. Read it, and then take a full man's size think, after which, read it again.

And remember that with loop anteannas, no larger than six feet square, and located in attics, a lot of us are hearing Lyons, France, Nauen, Germany, Mexico City, San Francisco and Honolulu, with regenerative hook-ups and bulb amplification. It seems safe to say that during the war improvements in receiving apparatus have been made by which the ordinary amateur may expect to be able to read signals one twenty-fifth of the strength that was barely audible when we stopped in 1917.

RESUMING QST

Just three years and five months ago, we got out the original and first QST. Little then did we dream of regenerative receivers, loop antennae, the Old Man's Wouff Hong, or a period of twenty long radioless months with no QST. Now we're back again. We're leaning over the same old editorial desk, and we feel quite sentimental as we reflect upon the situation and realize that our old friends are again with us, and that our amateur radio family is again seated around the ethereal table.

While the other radio developments are taking place, we have not been idle. We've installed, not a new amplifier, but a better system of keeping track of QST subscribers, and by golly, we expect every old reader and all the new ones to co-operate by doing their share. Here's how you can do it:-

1. Notify us of any change in your address. Give your old address and your new one, and we'll do our prettiest to see that your QST comes without a QTA.
2. If you have any complaint, don't spare us. Tell us the trouble and we'll correct our records and straighten out the difficulty, or dislocate something trying.
3. Perhaps some of your friends have not received their copy or do not know that QST has been resumed. For Heaven's Sake give them a CQ.
4. Don't get excited because QST isn't on the news-stands this month. That's because our Editorial and Distributing Departments have been suffering from the worst kind of heavy traffic. The msgs. are coming faster than our recorder will act. Next month you'll see QST in the old place. Tell the fellows it can be bought at the same old stand. If it can't be, help correct the situation by giving your news dealer's name and address. We will fix him.
5. Help the advertisers as you did in the past. Write to them and ALWAYS MENTION QST.
6. Get some of the new fellows to subscribe.
7. Read the above over again—and get a move on.

OUR ADVERTISERS

If any amateur is in need of a bracing tonic, let him take a full breath, and then turn to the advertising pages of this first issue of QST since the war. Let him stop and think that every single one of these manufacturers was caught napping just exactly as completely as we amateurs were, when the Navy Department suddenly removed the lid. The Department's intentions were so perfectly guarded that no one had a ghost of a suspicion that any thing was doing. Just the same, these manufacturers of amateur radio apparatus jumped into the emergency with just as much vigor as we amateurs did and left no stone unturned to play the game with us. When we approached them for their advertising, almost all came forward like true brothers and agreed to take space in QST. Some of them even said they would take space and advertise before they were actually justified in doing so. This is the kind of co-operation that brings results. Every amateur who reads these lines, wants to feel that his duty toward himself and amateurs in general, is not done until he makes a careful study of the apparatus that is advertised in this issue of QST, and writes to every manufacturer who offers anything that he thinks he might want. This helps the manufacturer, it helps the

amateur by getting all the results of the experimental work the manufacturer has done in perfecting his apparatus, and if QST is mentioned in the letters it helps QST. Therefore, fellows, whether you were one of the old gang, or one of the new comers, get into the game, study the advertisements, and write for all the information you need, and MENTION QST WHEN YOU DO IT.

THE WOUFF HONG

Honest fellows, we thought we had shell shock when we opened a package recently received from "The Old Man". Both a letter and package came in the same mail, and never having been honored before with a package from him, and hoping it might contain something new in the way of a receiving amplifier, we opened it first. Then followed the shell shock symptoms, and we leave it to the fraternity at large to say whether the Editor was not justified. On another page, we show an illustration of what the package contained. It was a WELL PRESERVED AND AN ABSOLUTELY AUTHORITATIVE SPECIMEN OF A WOUFF HONG. Attached was a card bearing the inscription, "To Editor C. D. Tuska, from The Old Man". We confess a distinct and uncanny chill in our midst when we regarded the thing. In fact, we have not yet entirely recovered our customary poise and self-confidence. It was shown to the Board of Direction at their meeting on May 3, in New York City, and each face noticeably blanched when the awful Wouff Hong was pulled forth and laid upon the table.

From several of the old man's stories, we judge that this instrument is used in some of the Middle Western States upon users of spark coils, and creators of unnecessary QRM. If this is the case, we shall make it our business to continue to reside in the East. We do not know which end of the Wouff Hong one lays hold of in order to operate it properly, but we suspect it is the smoother end, which has evidently been fashioned from an old hammer or hatchet handle. If this is the end grasped, we leave it to the imagination what is done with the other two savage looking terminals. The Editor invites comment as to the use of this weapon, especially from any one in the Middle Western States who may have been operated upon by it. For the present, it is framed and hangs in the Headquarters Office of the American Radio Relay League at Hartford,Connecticut, as a horrible example of what awaits amateurs who persist in causing unnecessary QRM.

AN ERROR.

In our article on A. R. R. L. bonds in the Midget issue of QST sent out a month ago, it was stated by Mr Maxim that the Institute of Radio Engineers raised funds by loans from the membership. Mr. Alfred N. Goldsmith, Secretary of the Institute of Radio Engineers, writes us and points out that this is not a true statement, and that we probably will want to correct it. We certainly do, and we hereby, at Mr. Maxim's earnest request, recall what was said. Instead it should have been said that the Institute of Radio Engineers at one time raised funds by loans from members of its Board of Direction and their friends. Some of us might not think this is a great difference, but as it evidently was of enough difference to disturb Mr. Goldsmith, we hasten to make the correction.

AN INVITATION.

QST is going to depend on you fellows, the same as in the old days, to write in whenever you have any good radio news on original apparatus, new hookups, new stations, or interesting observations on anything, which you can contribute to the good of the cause. This spirit of helping each other out thru the columns of QST has saved a ham's reputation more than once in the past, and we certainly need to hang together in these days of Rotten Starting when we don't remember L from C. Shoot in your dope!

The Operating Department

J. O. Smith, Traffic Manager
Rockville Centre, L. I.

After two years and one week of idleness, during which time all amateur radio work, both transmitting and receiving, had been absolutely under the ban, the amateur radio world, and all its connections and ramifications was thrilled by the formal notice of Acting Secretary of the Navy Roosevelt that the restrictions on amateur receiving were to be removed on April 15. The notice further stated that the ban on transmitting by amateur stations would be lifted when the peace treaty had been signed, and it is the understanding that the amateurs will not be required to wait until the peace treaty is formally ratified by the United States Senate and peace formally declared by the President.

The writer has been a member of the Board of Direction of the League since it was formed, about two and a half years ago. As the events of the "closed" season are looked back upon, it is a source of much gratification that those many nights spent at Board meetings, when there seemed nothing whatever to look forward to, have at last materialized in the partial reopening of our stations, and have also resulted in the formation of a strong traffic organization that includes most of the best--known amateur radio men in the country.

The loyalty and interest of these men has resulted in the perfection of a traffic organization that is practically as perfect as those of the national wire companies; that is, nation-wide in scope; and that is ready to lay out and maintain our traffic lines and take care of the relay traffic of the League as soon as the reopening of the amateur transmitting stations is accomplished.

The Operating Department of the League consists of a Traffic Manager, six Division Managers, and District Superintendents. The country is divided into six divisions, as shown by the map accompanying this article, and these divisions are in charge of the following division managers:

Atlantic—Charles A. Service, Jr.,Bala, Pa.

East Gulf—J. C. Cooper, Atlantic Nat'l Bank Bld'g, Jacksonville, Fla.

West Gulf—F. M. Corlett, 1101 East 8th St., Dallas Texas.

Central—R. H. G. Mathews, 1316 Carmen Ave., Chicago Ill.

Rocky Mountain—C. E. Hart, 306 N. 2nd W., Salt Lake City, Utah.

Pacific—L. L. Hoyt, Hotel Cherry, Seattle, Wash.

The assistant division managers and the district superintendents are appointed by the division managers. Applications for appointment to the trunk lines of the League should be made to the district superintendents, who have charge of all traffic arrangements. The superintendents report to the assistant division managers, the latter report to the division managers, and they, in turn, report to the traffic manager, who is responsible to and reports to the Board of Direction.

All members of the League who are desirous of taking an active part in its traffic affairs should take up the matter with the division manager who has charge of the territory in which they are located. There will be at least two district superintendents in each State, and more where conditions require it, and the services of all good League workers who want to take an active part in the traffic affairs can undoubtedly be utilized to good advantage.

The superintendents will be the contact points of the Operating Department with the general membership of the League, and in addition it will be their duty to see that in each town of any size in their district, local clubs are formed and affiliated with the League. It should be the purpose of these local clubs to handle local traffic and

to educate the radio beginner of the locality to be of greater value to himself than he has been heretofore, and also help him to a lawful operation of his station. The affiliation of these numberless radio clubs throughout the country with the League will build up an organization that will be big and powerful enough to make determined and effective resistance to any future measures to interfere unduly with amateur radio work.

In the days before April 6, 1917, the traffic of the League had reached such proportions that it called for constant effort to keep it moving, as practically all relay stations were loaded up, "going and coming". All who were familiar with the quality of this traffic agree that in a lot of cases there wasn't any quality to it, or, in fact any reason for its existance. When the relay work is resumed, it is to be hoped that all officers and members of the traffic department will have the courage to refuse the "Greetings-by-wireless" type of message. There will be enough of the "Will arrive- tomorrow" kind to keep us all busy, if we will only keep the way clear, so that prompt handling and delivery can be depended upon.

The Operating Department of the League will have a section of QST each month, in which will be recorded all the activities and developments of the department. A log should be kept by every station and a report made monthly to the superintendent of the district.. The superintendents should work these reports into a whole, covering their district, write a summary, and forward to the division manager. These reports should be headed, "District of Western Kansas, John Jones, Supt." Etc.

The division managers will work these reports into a general report of their division, write a general summary on affairs in the division in general, and send them to the Traffic manager, for his information and for use in QST. These reports must positively reach the Traffic Manager on or before the first of each month, or publication in the following month's QST cannot be guaranteed.

Membership blanks can be obtained by any member of the League desiring them by addressing the Secretary of the League, at Hartford. It would be a fine thing for the League if every member of it would make it his personal business to bring in at least one new member.

When the relay traffic of the League is resumed, this traffic will be handled in short relays, that will practically insure the ability of the League to keep traffic going under any conditions. If the relay stations are close enough together to insure reliable communication during daylight, it will meet the provision in the new constitution of the League which says that all relay work will be handled in such a way as will give everyone interested a chance to get into the game and also provide dependable communication under practically all conditions.

In connection with the reopening of transmitting stations, it might be well to bring to the attention of all interested the fact that all previous licenses, both operating and station, have expired, and that new licenses, for both purposes, must be secured from the Radio Inspector, of the Department of Commerce, according to the district in which the operator and station are located.

The attention of all amateur station owners who desire to transmit is also called to the provisions of Sec. 1, of the "Act to Regulate Radio Communication," approved Aug. 13, 1912, as follows: "That a person * * * * shall not use or operate any apparatus for radio communication * * * the effect of which extends beyond the jurisdiction of the State or Teritory in which the same are made, or where interference would be caused thereby with the receipt of messages or signals from beyond the jurisdiction of the State or Territory * * * Any person * * * that shall use or operate any apparatus for radio communication in violation of this section * * * shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine not exceeding five hundred dollars, and the apparatus or device so unlawfully used and operated may be adjudged forfeited to the United States.

In short, this means that a transmitting station cannot be operated without a license if the signals from it can be heard in another State or Territory, or if the signals interfere with the receipt of signals

by a neighboring station from outside of the State or Territory where located.

Transmitting station owners should also remember that the legal wave length for general amateur stations is 200 meters, and that the stations should be so tuned and adjusted as to conform to the decrement provision of the law, which is that it must not exceed two-tenths. Station owners should familiarize themselves with the necessary information to enable them to keep within the law as to wave length and decrement, as both these provisions of the radio law are to be rigidly enforced in the future by the Radio Inspectors.

The reopening of the transmitting stations will be the occasion for great advances in amateur radio work, in that many stations are now installing, or are preparing to install, undamped transmitters. These can be used for the transmission of undamped signals, modulated tones which can be received on crystal detectors, or for radio telephony. These transmitters will be of the tube type, as it is hoped and expected that the tube situation will be straightened out sufficiently soon to provide an adequate supply of receiving and transmitting tubes. With this type of transmitter the old questions of decrement and interference are practically solved, as it is true, in a general way, that in the case of a tube transmitter with a decrement, "there ain't no sech animal." The result is that a number of such transmitters can work in close proximity, without interference, an ideal condition when the usual heavy traffic of the League is considered. In addition, the same antenna current of undamped signals as compared to those of a damped, spark station, will be two or three times as effective at a distance as the spark signals, because of their persistance at the receiver.

At this writing, reports from all the Division Managers show that the interest is as great or greater in amateur radio than was true when the stations were closed, over two years ago. Many of the "boys" are still in service, but, to a man they say they will be ready and anxious to get their stations going again, as soon as Uncle Sam gets through with them. Everything looks fine for amateur radio at present, and every single man, woman or child interested should help to put it on a foundation so solid, and keep the art so clean, that no fault can be found with it in the days to come.

The work of organizing the Atlantic Division has proceeded to a point where two Assistant Division Managers and a number of District Superintendents have been apointed. Many of the former relay station operators are still away in the service of the Army and Navy, but enough of them both at home and in service have been heard from to insure resumption of former traffic arrangements as soon as the ban on transmitting is lifted.

The following appointments have been made:

Assistant Division Manager (for New England) Mr. Guy R. Entwistle, 137 Sutherland Road, Brookline Mass.

Assistant Division Manager (for Conn. N. Y. and N. J.) Mr. M. A. Mc Intire, 1127 Avenue G. Brooklyn, N. Y.

District Superintendent for lower Mass. Mr. H. C. Bowen, 168 Belmont Ave., Fall River, Mass.

District Superintendent for western Connecticut, Mr. H. E. Nicholls 513 Pequonnock St., Bridgeport Conn.

District Superintendent for eastern New York (excepting New York City, Long Island and Staten Island) Mr. C. R. Runyon, 544 No B'way, Yonkers, N. Y.

District Superintendent for Western New York, Mr. W. T. Fraser, 48 Glenwood Ave., Buffalo, N. Y.

District Superintendent for eastern Long Island, Mr. H. L. Stanley, Babylon N. Y.

District Superintendent for northern New Jersey, Mr. Lester Spangenberg, Clifton, N. J.

District Superintendent for New York City and Bronx, Mr. John Di Blasi, 153 East 86th St., New York City. (East Side Y. M. C. A.).

District Superintendent for eastern Pennsylvania, Mr. Chas. H. Stewart, St. Davids, Pa.

All station owners in the Atlantic Division who are interested and desirous of taking an active part in the traffic work of the League are requested to communicate with the nearest district superintendent.

Where no district superintendent has been appointed, correspondence should be addressed to the Division Manager or Assistant Division Managers.

ATLANTIC DIVISION (NEW ENGLAND SECTION.)

Mr Guy R. Entwistle, Assistant Division Manager, 137 Sutherland Road, Brookline, Mass.

When the ban was put on amateur radio, two years ago, it put an end to the encouraging development of relay work throughout New England. At that time we had in operation an outlet for New England traffic, with Boston as the nucleus, and passing through Burlington, Marlboro, Worcester, Springfield, Hartford, and Bridgeport, to Long Island, and thence to New York, and the South and West.

Steps had been taken to expand this line to the northern New England States of New Hampshire and Maine. We were fortunate in obtaining the co-operation of the special station 1ZH, owned and operated by Mr. Wilbur Hardy, who was in regular communication with the University of Maine. There is every reason to expect that similar arrangements can be made as soon as the transmitting stations are allowed to resume operation.

Mr. H. C. Bowen, of Fall River, has been appointed District Superintendent of lower Massachussetts, with the object of establishing a southerly shunt line for traffic.

It is to be hoped that all amateurs of this section will realize the advantages of organizing their efforts and fall in with the A. R. R. L. and reap the benefits of a united effort to firmly establish the amateur in the radio profession. I should like to hear from amateurs in the New England district who are able and willing to take an active part in the traffic organization of the League.

EAST GULF DIVISION.

Mr. J. C. Cooper, Jr., Manager,
Jacksonville Fla.

To Radio Amateurs in Arkansas, Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee:

Since my return from the service, I have agreed to act once more as Division Manager for the American Radio Relay League in the Eastern Gulf Division, which includes the above mentioned States.

I want to appoint several district superintendents in each of these States to take immediate charge of making traffic arrangements for amateur radio relay work when transmitting stations are once more authorized. I am anxious to hear from each radio amateur in any of the above States who has been previously interested in radio relay work and who intends to take it up again Even if you are still in the service when you see this, write to me and tell me what your plans are.

The number of stations in the Eastern Gulf Division was always small and each amateur who has a good station, or has in mind the building of a good station, can help out. I am especially anxious to hear from the old-timers who would be willing to serve as district superintendents if appointed.

Address me at 804 Atlantic National Bank Building, Jacksonville. Florida.

J. C. Cooper, Jr.

CENTRAL DIVISION.

R. H. G. Mathews, Manager,
Chicago, Ill.

During the period of inaction due to the closing of the amateur stations during the war, the Division Manager and his assistants have devoted considerable thought to a new plan of organization for the relay work of the Central Division.

By this plan, at least two District Superintendents will be appointed for each state. It will be necessary for appointees to the positions of District Superintendents to have good long-distance stations, and to possess the faculty of forming and holding together an organization. It will be the duty of these men to form intra-state routes which will connect their own stations with as many towns in their districts as is possible.

Further, it is the intention of the Division Manager to intrude upon a new field, with several objects in view. The principal difficulty experienced in former efforts at long distance communication was introduced by the interference of smaller stations. This interference, it is believed,

may be very considerably reduced, if not entirely eliminated, by the proper education of the operators of these interfering stations . It has been the writer's experience that by first convincing the more or less radio-untrained operator that proper tuning of his transmitter is desirable, both from his standpoint and from that of the rest of the stations in his vicinity, and after convincing him of the value and the necessity of tuning and general compliance with the law, it will be usually found that he is willing and anxious to be taught how to accomplish this. It will therefore be the duty of each Dist. Supt to see that in each town of any size in his district, local clubs are formed, **affiliated with the A. R. R. L.'s National organization,** with the local A. R. R. L. official relay operator at the head of, or at least prominent in his local association. It will be the purpose of these local clubs to so accomplish the education and training of the radio beginner that his station will be of greater value to himself and to the relay game, and that he also will not be the unconscious violator of the law that he has been heretofore. For wilful violations, of course, there are due penalties prescribed by law, and it is believed that enforcement will be carried on more strictly than before the war.

The objects of our association have always been, first, the carrying on of speedy and consistent relay work, and second, the development of the interest of as great a number of radio men as possible. In the past, the latter has been more or less neglected, because of the very limited nature of the old Trunk Line system. By the new plan, it is hoped that good results may be secured along both lines.

The following appointments have been made:

Assistants to the Division Manager—L. E. Dutton, Chicago, Ill. and P. B. Parks, River Forest, Ill.

Traffic Assistant to the Division Manager. R. J. Iverson, Maywood, Ill.

District of Southern Indiana, Superintendent,—F. F. Hamilton, Indianapolis, Indiana.

District of Northern Wisconsin, Superintendent,— H. I. Crawford, Wausau, Wis.

District of Southern Wisconsin, Superintendent, H. J. Burhop, Sheboygan, Wis.

Assistant District Superintendent,—C. F. Bates, Milwaukee, Wisconsin.

Assistant District Superintendent—M. C. Lapp, Plymouth, Wisconsin.

District of Eastern Ohio, Superintendent —A. J. Ball, Hubbard, Ohio.

District of Kentucky, Superintendent— H. A. Loveless, Somerset, Kentucky.

District of Kansas, Superintendent—R. K. Trump, Topeka, Kansas. Assistant Superintendent—W. A. Beasley, Topeka, Kansas.

District of Northern Minnesota, Superintendent— Werner A. Birch, Chisholm, Minnesota.

Others will be appointed for the rest of the division as the proper appointees become evident, and also, the territory assigned as above may be subdivided, if deemed advisable. It should be kept in mind that appointments will be made solely on merit, taking into consideration not only the quality of the appointee's station, but also personality and character.

Applications for appointment as official relay station, must be made through the Superintendents of the applicant's district, or, in case that no District Superintendent has as yet been appointed, may be made direct to the Division Manager.

In accordance with instructions, reports have been made by the various District Superintendents of the activity within their districts and all these reports show a gratifying interest in the work of the A. R. R. L. and it is believed that, if the above described plan can be put into operation, a tremendous increase in the value of the A. R. R. L. to its members will result, as well as increased efficiency in relay traffic handling.

The organization of local branches in many cities throughout the Division has already begun and accordingly it is urgently requested that the Secretaries of already existing local clubs communicate with the proper District Superintendents or with the Division Manager at Chicago, with a view toward affiliating their clubs with our National organization, thus helping and benefitting both themselves and the League.

ROCKY MOUNTAIN DISTRICT.

Mr. Cedric E. Hart, Manager,
Salt Lake City, Utah.

All amateurs in the Rocky Mountain District, who are interested in the A. R. R. L. an organization of amateurs, by amateurs and for amateurs, and who want to take an active part in the traffic work of the League, are requested to communicate with me at once.

PACIFIC DIVISION.

Mr. L. L. Hoyt, Manager, Hotel Cherry,
Seattle, Washington.

Having located in this section since the war, I do not know as yet just what the conditions are, although I understand that a prevalence of bad atmospheric conditions exists during a considerable part of the year. However, I believe that a lot of this trouble can be obviated by the use of scientifically designed apparatus. I expect to be permanently located on the Alki side of Puget Sound, and hope to be able to get traffic through to San Francisco over Trunk "F". A lot will be heard from the amateurs of the Northwest in the future.

All amateurs who are desirous of taking an active part in the relay work of the League in the Pacific States are requested to communicate with me at once.

WEST GULF DIVISION.

Mr. F. M. Corlett, Manager,
111 East 8th St., Dallas, Texas.

Many of the former relay station owners of this division are still in the service, but enough of them have been heard from to indicate a spirit of enthusiasm for the relay work of the League, and our organization work is going right ahead.

All amateurs interested are requested to write at once.

Personal Notes

(In these days of reconstruction or, more accurately, relocation, some of us are having a hard time finding where some of our old friends are, and what they've been doing since last we heard their spark. Lack of room has limited the items in this issue —Ed.)

R. H. G. Mathews, 9ZN, Chicago, Radio Gunner, U.S.N.R.F., served the duration of the war in the office of the District Communication Supt. at NAJ. For the past several months he has been in charge of the Naval Radio Intelligence Office in that district. Mr. Mathews was recently elected Vice President of the A.R.R.L., and is Manager of the Central Div.. of the Operating Dept. 9ZN promises to bloom forth in great style when the lid is lifted.

Jas. L. Autry, Jr., 5ED, Houston Texas, was a student in the S.A.T.C. at Rice Institute, Houston, during the war, and can be counted on to be on the job in Houston.

Our friend Harmon B. Deal, of 9NN, Cape Girardeau Mo., was Elec. 1st Class, U.S.N.R.F., and an operator at WCX for many months. More recently he was released to return to his studies and is now a Junior at M.I.T. We shall miss 9NN.

"Pink" (L. A.) Kern, of 9GY, writes us from Ann Arbor that 9GY will not be among those present but that he hopes to be on the brass at 8XA when reopening comes.

S. Kruse, of Lawrence Kansas fame, after a year in NewYork City with Western-Electric, is now engaged in radio work at the Bureau of Standards, Washington.

Old 9EP, Guy Wilson, late of Kansas City, is located in New York City in engineering work for Ogden-Armour & Co.

1st Lt. C. D. Tuska, of this office, put in a pretty full time of it. He was O.I.C., Air Service School for Enlisted Radio Operators, Ellington Field, Houston, and later Post Radio Officer at Love Field, Dallas, and Camp McClellan, Anniston, Ala. He has received his discharge and is now designing engineer for A. C. Gilbert Co., New Haven, beside exercising a fatherly supervision over QST and the activities of the League.

Lt. K. B. Warner, Air Service, formerly 9JT and 9FW, Cairo, Ill., also served in Texas as radio instructor at the school at Ellington Field, Houston, and later in the same capacity at the Radio Officer's School, Columbia University, New York; still later,

as Asst. Technical Officer, Radio Branch, Training Section, Washington and Bolling Field. He has now been released from service and was recently elected a member of the Board of Direction and Secretary of the A.R.R.L. with offices in Hartford.

We recently received a very interesting letter from Sgt. F. K. Ostrander, Jr., formerly 1MO at Springfield Mass., and at La Courtine, France, with the A.E.F., describing his army telephone and radio work, and expecting to be back in amateur work in the States soon.

Readio, of 1ZS, also a Springfield man, instructed draft men in radio thru the entire war. Another Massachussetts chap who was sidetracked onto instruction work was St. James, 1IZ of Great Barington, who was a C.P.O. at the Naval Radio Sshool at Harvard.

Mr. J. O. Smith, our Traffic Manager, formerly 2ZO of Valley Stream, L. I., did civilian service in the O.D.M.A., Radio Training, Washington, having charge of the purchase, storage and movement of radio material for that branch. Mr. Smith is now located at Rockville Centre, L. I., and is doing commendable work in the organization of the A.R.R.L. Operating Dept.

Lt. Comdr. H. C. Gawler, U.S.N., former Radio Inspector of the 1st District, has been doing extensive radio work in the Azores and elsewhere, and is expected home soon on his old job.

Lt. J. C. Cooper, Jr., U.S.N., one of our Directors, has just been discharged from service in the office of the Naval Communication Dept., Washington, and is back on his old A.R.R.L. job at Jacksonville, Fla.

(Concluded on page 25)

OUR FINANCES

The Loan and Membership Dues

The "Midget Issue" of QST which was sent out a month ago probably did not reach the eye of all of us, so it seems desirable to tell again about the plans of the Board of Direction for raising the money to resume the publication of QST, and to do the reorganizing work that is necessary after two years of enforced idleness.

The Board of Direction, which is the working committee which runs the American Radio Relay League, met immediately after the removal of the restrictions on receiving and after several long sessions, evolved the plan for raising the money that was needed to start things going. The plan consisted of making a loan from the membership and to urge everybody to pay his dues right away. These two sources of income, it was estimated, would be enough to carry us over the time between starting and when we would become self-supporting. The latter condition would seem to be brought about just as soon as the manufacturers were prepared to supply us with apparatus and advertise this apparatus in QST. Once that QST was in a position to support itself, and our small running expenses, we would have our membership dues to pay back our loan with its interest.

This, in brief is the plan. It will work, without doubt, unless another war comes along, or something else happens which would cause the Government authorities to again close down on amateur wireless and stop the sale of apparatus. This is not likely to happen. Therefore, we expect to be able to have the money to resume the publication of QST and to revive our organization and also to pay back this money within two years' time at the longest, and if the fellows help us and co-operate, in less time.

But, the whole structure hinges upon the one requirement that the fellows COME ACROSS. We want to see them do it because we know the crowd generally throughout the country wants QST and wants an A. R. R. L. It is only a question of jogging the memory of everybody. So we are writing this little jog. The loan takes the form of Certificates of Indebtedness. The Certificates are of all denominations starting at $1.00, and going up to $200.00. They bear interest at 5% per annum, just like any other loan, and they will be paid back in two years any way, and probably less time. Every amateur

ought to feel that it is absolutely his duty to take some of the Certificates of Indebtedness as often as he is financially able. It is not money spent, but money saved. A dollar is just as welcome as $200.00, because it indicates the spirit of our fellowship. In addition to this, every amateur ought not to feel satisfied until he has joined us other amateurs and paid his yearly dues. These amount to $2.00 and include a subscription to QST for one year.

There is the story. Come on in with the rest of us. The water is fine.

THE AMERICAN RADIO RELAY LEAGUE.

APPLICATION BLANK

THE AMERICAN RADIO RELAY LEAGUE, Inc.
Hartford, Conn.

I desire to become a member of / renew my membership in The American Radio Relay League and I am remitting herewith my yearly dues of $2.00.

Name.....

Address.....
Street, Town, State

Age..... Did you have an Operators License?.....

If so what grade?.....

Did you have a Radio Station?.....

Give short description.....

.....

.....

.....

Date..... Signed.....

CUT OFF HERE

The Treasurer
American Radio Relay League
Hartford, Conn. :

Date.....

I am enclosing $....., which is a loan for two years at 5% interest to the American Radio Relay League, Inc. Please remit my A.R.R.L. Bond to the following address:

Name.....

Address.....
Street

.....
Town State

PERSONAL NOTES.

(Concluded from page 23)

V. F. Camp, Brightwaters, L. I., served as 1st. Lt., Air Service, and is also now out and at his old address.

Howard Stanley, Babylon, L. I. , who is connected with the Western-Electric Co., served during the war in the Bureau of Aircraft Production, Washington, dealing with V. T. production problems.

Ensign Chas. A. Service, Jr., U.S.N.., is still in the service at the office of the Director of Naval Communication Service, Washington, but expects to soon be back on his A R.R L. duties at Bala, Pa.

Sgt. Louis G. Frank, U.S.S.C., formerly of Brookline, Mass , is still in the border radio service with R.T.U. 39, now at Sutherland Springs Tex.

Our Treasurer, C. R. Runyon, Jr., was a C.P.O. in Navy radio, but has been discharged and is now again at Yonkers and at his A.R.R.L. duties.

A recent letter from C. W. Patch, Manager of the Dubuque (Iowa) Wireless Association, announces very interesting and commendable reorganization activities in that body. Dubuque has had a radio club for a good many years, and we expect big things of the D.W.A. under Mr. Patch's able management.

Indianapolis just now is the scene of much amateur activity. There are four radio clubs there, three being High School organizations, and the other the main organization of the city—the Hoosier-Scout Radio Club. The activity in Indianapolis is very closely allied with the work of the Boy Scouts of America. Mr. Francis F. Hamilton, an A.R R.L. District Superintendent and a progressive enthusiast is the leading light in Indianapolis affairs and did commendable work at Washington recently when amateur radio was on trial for its life.

In Memory of William D. Woodcock, Ex-8SK

Buffalo, N. Y., May 3, 1919.

The Treasurer,
American Radio Relay League:

The special bulletin of the A. R. R. L. sent to my son, W. D. Woodcock was received.

I am sorry to tell you that he will never join his old friends in the air again.

He died on Sept. 29 of pneumonia following influenza, at the Great Lakes Training Station.

William enlisted in the U. S. N. R. F. (radio) in April, 1917. In September he was released from active duty to continue his college work and returned to Great Lakes July 6, 1918. From that time until his death he was at the Radio Laboratory, Great Lakes.

He was an enthusiastic Wireless Amateur and always enjoyed Q S T and I know he would have wanted it to start again.

Will you kindly accept the enclosed check from Mr. Woodcock and myself in memory of our son and the benefits and pleasure he received from Q S T.

Very truly yours,

Emma J. Woodcock (Mrs. Geo. M.)

FOR SALE & EXCHANGE

ANNOUNCEMENT—Formerly in these columns QST provided a free service for its readers, but we found advantage taken of our offer by parties who were merely beating the advertising game, and it is not always possible to draw the line of demarkation between a genuine amateur situation which we could assist by free publication, and the commercial proposition. We have therefore decided to open the customary classified columns, and will receive advertisements for this section at five cents per word, payable in advance. Copy must be in our hands by the 10th of the month for the succeeding month's issue.

OMISSION

Unfortunately it was impossible to obtain cut of the map mentioned by Mr. Smith on page 17, in time to print in this issue. The map appears in the May, 1917, issue of QST, copy of which will be furnished at the special rate of 10c. as long as the supply lasts

Editor

EUGENE C. BROWN
PATENT LAWYER
Electrical Engineer, Lehigh Univ.
Former Examiner Elec. Div. U. S. Patent Office
PATENTS AND PATENT LITIGATION
734 Eighth St., N. W. WASHINGTON, D. C.

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NATIONAL RADIO INST., Dept. 76, Washington, D.C.

?? READY ??

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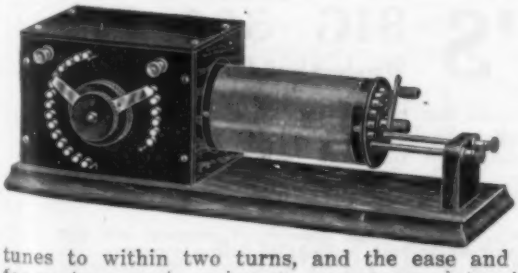

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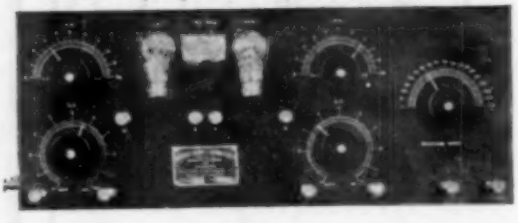

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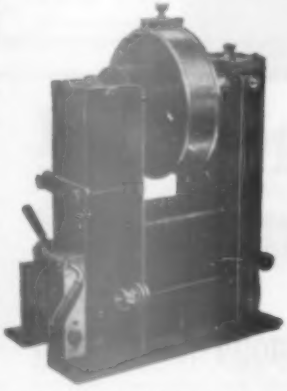

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